A STUDY OF INTERACTION AND SELECTED PURPOSES IN ADVISORY GROUPS

By

Worley Thaxton Springfield, Jr.

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A STUDY OF INTERACTION AND SELECTED PURPOSES IN ADVISORY GROUPS

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Worley Thaxton Springfield, Jr.

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The purpose of this study was to determine the success of the advisory group program in achieving certain of their goals as reflected by changes in verbal interaction.

In an attempt to counteract the negative potential coincidental to an innovation in the curriculum at the P.K. Yonge Laboratory School, the faculty proposed that advisory groups be established. Every pupil in the high school was placed in one of six advisory groups in his grade level. Instructional and staff members served as advisors.

Six purposes were included in the original proposal for advisory groups. They are: 1) to provide each student with a stable group to which he can relate as a "home base," 2) to provide the student with a place for dialogue about school-related problems, 3) to build a feeling of community among students, 4) to provide each student with an adult who is responsible for the coordination of his total school experience, 5) to provide faculty members with common

experiences to increase involvement in the total school program, and 6) to provide early identification of students with problems and to assist them in the solution of these problems. The groups also served as the administrative unit and as the representative unit for student government.

Purposes 1, 2, and 3 were those selected as criteria for this study. The faculty felt that the achievement of these goals would establish the merit of this program as new and valuable. If evidence could be gathered which indicated that the groups were providing a "home base," a place for dialogue to take place, and sense of community, then the advisory group model could become a valuable adjunct to a total curriculum.

To form one basis for measuring whether or not these purposes were achieved in any part, eleven hypotheses were proposed. All eleven hypotheses deal with aspects of verbal interaction. The review of the literature for this study suggested that a sufficient basis existed to suppose that verbal interaction reflected levels of tolerance, trust, understanding, and unity in the group situation. By measuring changes in verbal interaction, insight would be obtained into changes in the levels of tolerance, trust, understanding, and unity.

Interaction Process Analysis, a category observation system developed by Robert F. Bales, was the instrument used to gather data. Data were gathered on nine separate

occasions: three times at the first of the school year, three times at the middle of the school year, and three times at the end of the school year. Each of the six groups in the sample was observed and verbal interaction recorded for twenty minutes on the nine data-gathering sessions. Due to circumstances beyond the control of the researcher, one group was observed only five times and one other group only six times.

The raw data, numbers of interactions in specific categories, were converted to proportions and tested for ten hypotheses via the analysis of variance method. Significance was recognized for values of F at or beyond the .05 level. For the eleventh hypothesis, the proportions were tested via a t test. Significance was recognized for t values at or beyond the .05 level on a one-tailed test. In addition to these values, the mean proportional values per observational period were analyzed graphically for each hypothesis.

On the basis of statistical and graphic analysis of observational data it is not possible to conclude that the advisory group program made measurable movement toward achievement of its goals 1, 2, and 3.

CHAPTER I

INTRODUCTION

In the Spring of 1971 the faculty of the P.K. Yonge Laboratory School recognized that their forthcoming modular schedule might encourage an environment in which the student would perceive an increase in the distance between himself and the school. Unless otherwise established, intercourse among students and teachers could become limited to classroom business, generating an impersonal atmosphere in the school. This possibility prompted the faculty to propose a system of groups whose purpose was to increase and institutionalize teacher-pupil interaction for the ultimate educational goal of greater learning. These groups would be called advisory groups. Each grade of 90 students would be divided into six groups, each under the guidance of a member of the secondary faculty, guidance staff, or administrative staff. These persons would function, not as teachers, but rather as discussion leaders, reference sources, and activity coordinators.

Formally, the purpose of these groups was to be six-fold: 1) to provide each student with a stable group to which he could relate as a "home base," 2) to provide the

student with a place for dialogue about school-related problems, 3) to build a feeling of community among students, 4) to provide each student with an adult who is responsible for the coordination of his total school program, 5) to provide faculty members with common experiences to increase involvement in the total school program, and 6) to provide early identification of students with problems and to assist them in the solution of these problems. In addition, these groups would serve as the administrative unit and the unit of representation for the student government.

One measurable dimension of achievement toward group maintenance, moral, identity, and supportive purposes is interaction. Since growth and change in group processes are reflected in alteration of rate and pattern of interaction, measurements of rate and pattern should provide an indication of group development. The purpose of this study was to quantify selected changes in rate and pattern of interaction to determine the effectiveness of the advisory groups in achieving the formal purposes numbered 1, 2, and 3, above. Change in rate was identified by increases or decreases in amount of interaction as measured by the systematic observation system described by Robert F. Bales in Interaction Process Analysis.[1] Change in pattern was identified by

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1. Robert F. Bales, Interaction Process Analysis (Cambridge: Addison-Wesley Press, Inc., 1950).

the increasing or decreasing use of certain categories as measured by the Bales instrument.

Significance

Traditional practices in education which separate the school-learning environment from the rest of the learner's life are being replaced by practices which not only deny this duality but insist upon the interdependence of the two areas. The practical duality that has and still exists maintains that the classroom exists in virtual social and psychological isolation from the remainder of the individual's environment. Under these circumstances, the critical influences that bear on learning are directly accessible to the educator. The alternative position, that the classroom is not isolated and, therefore, some factors not readily accessible to the teacher influence the ability of the student to learn, has held theoretical importance for some time. Only recently is the alternative gaining any widespread significance.

If the advisory group program is to be proposed as an alternative, it must be demonstrated, empirically, to work. To the extent that interaction analysis measures movement toward purposes 1, 2, and 3 of the advisory groups, this study will measure some criteria of success or lack of it in the P.K. Yonge program. If the program fails, as measured by interaction analysis, we should be aware that

other methods should be tried. But if the groups succeed, one model, with some demonstrable evidence, will be available to teachers to help them deal with the student's total environment for the improvement of their education.

CHAPTER II

REVIEW OF THE LITERATURE

This review of the literature may be viewed in three parts. Part one describes programs similar to the advisory group system and discusses the significance of these programs as educational methods. Part two examines three measurable effects, evident when individuals participate in groups, which are shared by the programs in part one and discusses these effects in relation to the purposes numbered 1, 2, and 3 of the advisory groups. Part three discusses interaction as one of the means by which these effects are realized and the degree to which changes in interaction among individuals in groups reflects movement toward or away from those effects.

The idea that schools are potentially impersonal and that steps should be taken to avoid or assuage this potential is not new. Home rooms, defined as a "means of providing pupil-teacher contacts in a large school,"[1] were established as early as 1875.[2] Jones also reports that by 1925 growth had plateaued at a high level. Harry C. McKown offers a

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1. James F. Baker, "A Home Room Plan," School Review, 21 (April, 1913), 235.

2. Galen Jones, "Extracurricular Activities in Relation to the Curriculum," Teachers College Contributions to Education, No. 667 (1935), 17.

more complete description of the home room as a "regular school period, usually weekly, in which the teacher or sponsor meets with an organized group of students for the purpose of becoming intimately acquainted with the members, and, through individual contacts, and programs and activities, promotes the development of certain personal ideals, knowledges, and habits not now regularly provided for in the teaching of the traditional school subjects." Furthermore, he says, "The home room places its main emphasis upon the education of the student rather than [the] passing along of a body of subject matter."[3] An even fuller definition is found in the work by Joseph Roemer, Charles F. Allen, and Dorothy A. Yarnell. They begin briefly: "that unit of the school's organization in which pupils are grouped for purposes of carrying on school routine and for stimulating and developing pupil initiative through various types of home-room activities." This framework is filled out by these words: ". . . the home room is not merely administrative in function. It is, at the same time, the place where individual interests, problems, and initiative find solution and outlet, and where group ideals are fostered and lived. Here guidance is carried on; discipline is administered; self-consciousness is overcome; individual problems are solved; pupils are inspired to greater effort; sympathies are broadened;

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3. Harry C. McKown, Home Room Guidance, 2nd ed. (New York: McGraw-Hill Book Co., Inc., 1946), p. 22.

leadership and intelligent obedience are developed. . . . The home room is, in fact, a means of contact connecting and correlating the interests of teacher, pupil, school, parent, and community, and fostering a broader view of the privileges, duties, and responsibilities of an intelligent citizenry."[4]

In ideal conditions the home room was to serve as a place where guidance was available as it was in no other place in the school environment. Other units of the school had as their responsibility administration, subject matter, or physical health, but no other one was concerned with emotional and attitudinal development as was the home room.

While practical application of these ideas resulted in abuse and modification, theoretical interest in the potential of the original concept remained high. Compare the justification of 1935 with those given during the past twenty years. The first World War, urbanization, industrialization, and a developing educational philosophy combined to produce a situation significantly different from that of the middle and late 1800's. Roemer, Allen, and Yarnell described the differences between the latter half of the nineteenth century and the first third of the twentieth century in this manner: ". . . homogeneous personnels changed to heterogeneous student bodies; programs of studies multiplied their

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4. Joseph Roemer, Charles F. Allen, and Dorothy A. Yarnell, Basic Student Activities (New York: Silver, Burdett and Co., 1935) p. 22-24.

offerings; secondary schools varied their curricula to meet the ever changing and broadening need of their student enrollments; new psychology suggested new methods; and improved transportation and communication facilities gave democracy a new meaning. The greater amount of leisure time made possible by inventions gave more time for education. . . . The World War had a tremendous influence on the social and civic phases of citizenship."[5] Philosophical changes in educational objectives suggested by the Commission on the Reorganization of Secondary Education, J. Franklin Bobbitt, and others added to the increasingly complex educational environment.[6] Roemer et al. state that "the student was being lost sight of in the melee of mass organization and administration. . . . There had to be some way devised to provide closer contact between teacher and student."[7] That way was, of course, the home room.

Twenty years later, the same general position was not only sound but also achieved a distinct theoretical base of its own, now called developmental guidance. In 1953, Little and Chapman defined developmental guidance: "To provide for each pupil guidance and instructional services which are planned and implemented in accordance with his powers to develop personally, socially, educationally, and vocationally."[8]

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5. Ibid., p. 28-29. 6. Ibid., p. 30. 7. Ibid., p. 29-30.

8. Wilson Little and A.P. Chapman, Developmental Guidance in Secondary School (New York: McGraw-Hill Book Co., Inc., 1953), p. 257.

The emphasis on providing for the needs of each and every child is a distinctive facet of developmental guidance as a guidance program. Thus Peters and Farwell, in a brief historical sketch of developmental guidance, assign significance to the distinctly modern American ideal of individual uniqueness and individual right to maximum development as instrumental in the growth of developmental guidance.[9]

Dinkmeyer and Caldwell describe with clarity that "guidance is that part of the educational program which emphasizes the individual. While it does not deny the remedial and corrective aspects of guidance, developmental guidance instead works toward assisting each child to utilize his opportunities for learning and personal development. It is concerned with the average youngster who, because he presents no special problem, frequently receives minimal attention. This service is not a specialized therapeutic service adjunctive to the school, but it is a part of the educational process. It is concerned with helping the child as a learner."[10]

The degree to which developmental guidance can "help the child as a learner" is related to its ability to develop positive attitudes in the child toward self and one's self-

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9. Herman J. Peters and Gail F. Farwell, Guidance: A Developmental Approach (Chicago: Rand McNally & Co., 1967), p. 28.

10. Don Dinkmeyer and Edson Caldwell, Developmental Counseling and Guidance: A Comprehensive School Approach (New York: McGraw-Hill Book Co., 1970), p. 3.

worth. For as both Dinkmeyer and Caldwell[11] and Peters and Farwell[12] state, a great deal of evidence, empirical and theoretical, has been produced to support a relationship between self-concepts and ability to achieve. Therefore, if a program of developmental guidance, such as the advisory group program, is to be successful, it must influence the growth of positive attitudes of self and self-worth.

Three effects of individuals interacting in groups are chosen, from many, to demonstrate that certain aspects of the group, as a social system, may be empirically related to purposes 1, 2, and 3 of the advisory groups. One effect of individuals interacting in groups that has been related to feelings of community and openness is cohesiveness. Hubert Bonner defines cohesiveness as, "the totality of forces which induce members to remain in a group."[13] In other words, cohesiveness might be equated with the sense of community in a group. These forces are divided by Dorwin Cartwright and Alvin Zander into "at least two types of components: a) forces that derive from the group's attractiveness and b) forces whose source is the attractiveness of alternative memberships."[14] In a footnote those authors

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11. Ibid., p. 6

12. Peters and Farwell, p. 29.

13. Hubert Bonner, Group Dynamics: Principles and Applications (New York: Ronald Press Co., 1959), p. 66.

14. Dorwin Cartwright and Alvin Zander, eds., Group Dynamics: Research and Theory, 3rd ed. (New York: Harper and Row, 1968), p. 92.

add a third component, "forces against leaving the group that result from costs associated with leaving or from other restraints."[15] Cohesiveness has been operationally defined by scores on various self-report inventories, sociometric analyses, and interaction profiles.

The relationship between cohesiveness and community has been explored by several authors. Stanley Seashore found support for the hypothesis that degree of cohesion, or in our terms, community, was positively related to personal attraction among members, opportunities for interaction, and power of the group to common conformity.[16] Cooperation, which Martin Grossack says is a determinant of group cohesiveness, can be related to communication patterns, which are measurable by systematic observation instruments. In his study, Grossack found that members perceived as cooperative "received significantly more communications, more instrumental communications (opinion and information), and fewer consummatory communications (tension and antagonism)."[17] Using slightly different terminology, Robert Porter suggested that expressed, individual satisfaction would be related to amount of participation. The results of Porter's study indicated

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15. Ibid., footnote, p. 92.

16. Stanley Seashore, "Group Cohesiveness As a Factor in Industrial Morale and Productivity," Dissertation Abstracts, 14 (1954), 1268.

17. Martin Grossack, "Some Effects of Cooperation and Competition Upon Small Group Behavior," Journal of Abnormal and Social Psychology, 49 (July, 1954), 347.

that instead of participation in general, expressed satisfaction was related to amount of group-oriented participation.[18]

Another effect we might examine to explore the practicality of the advisory groups is similarity of attitudes and values. If the advisory group system is to approach its basic goals of community and communication we should expect that the attitudes of the group members, particularly those related to the values of respect for others and tolerance, would become increasingly similar. The research does indicate that this takes place. In a general statement, Mary Alice Monk said that membership in a group is related to perception of greater similarity in attitudes among the group's members.[19] James Bieri found support for his hypothesis that in situations believed to be constructive the individual perceives others with increased similarity to himself.[20] In an experimental study of communication in small groups whose members represented various ethnic groups, Lawrence Hamilton found significant suppport for believing

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18. Robert M. Porter, "Relationship of Participation to Satisfaction in Small Group Discussions," Journal of Educational Research, 59 (November, 1965), 130.

19. Mary Alice Monk, "Some Effects of Group Membership on Attitudes and the Perception of Others' Attitudes," Dissertation Abstracts, 14 (1954), 1267.

20. James Bieri, "Changes in Interpersonal Perceptions Following Social Interaction," Journal of Abnormal and Social Psychology, 48 (January, 1953), 66.

that attitudes towards self and other ethnic group members can be changed.[21]

A third measurable effect of the interaction of individuals in groups in relation to purposes 1, 2, and 3 of the advisory groups is sociometric ratings. Sociometric rating may be described as diagrams of intra-group interaction. One explanation of how sociometrics reflects the growth of community is offered by George Homans. Homans points out that a self-supporting cycle tends to develop in which people thrown together interact more with group members than with nongroup members. From this interaction evolves a sense of community. The similarity, among individuals, of interest and attitude that results when a sense of community emerges in a group is reflected in sociometric analysis. These techniques show that in these groups the average number of interpersonal relationships per individual increases. And to complete the cycle, expansion of the social network means that shared activities increase.[22] Experimental support for this hypothesis by Gene Stanford compares traditional subject-matter classes that incorporated human relations training with subject-matter classes that included no overt effort to include the principles of human relations training. He found that academic achievement was comparable in

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21. Lawrence Hamilton, "An Experimental Study of the Effectiveness of Small Group Discussions in Facilitating Inter-Ethnic Group Communication and Understanding," Dissertation Abstracts, 30 (1969), 2849A.

22. George Homans, The Human Group (New York: Harcourt, Brace, 1950), p. 444.

the two groups but, more importantly, that the experimental group was significantly different from the traditional group in acceptance of others.[23] In a study of group dynamics, Trotzer found that group-centered groups were significantly different from topic-centered (structured) groups on the basis of empathy, unconditional positive regard, and depth of self-exploration.[24] Silluzio explored the relationships between interaction and sentiments in his doctoral study. The experimental groups were arranged to attend all classes together, be graded by a distinctive system, have flexibility in their schedules, and have the same teachers. The control group was drawn from the population of students that had few common classmates, the traditional grading system, inflexible schedules, and varying teachers. The experimental group proved to have significantly more favorable attitudes toward their peers than did the control group.[25] Expressed in terms of this study, individuals who interact at high levels, as they will in the advisory groups, develop a sense of sameness or community. A study which demonstrates one advantage of a dispersed period of treatment, as are the

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23. Gene Stanford, "Sensitivity Education and the Curriculum," Educational Leadership, 28 (December, 1970), 248.

24. James Peter Trotzer, "The Effect of Group-Centered and Topic-Centered Methods on Group Process and Outcomes," Dissertation Abstracts, 20 (1969), 42374.

25. Vincent Joseph Silluzio, "An Evaluation of an Experimental Program Designed to Affect Student Attitude and Academic Achievement Through Modifications in the Institutional Structure of a High School," Dissertation Abstracts, 31 (1970), 902B.

advisory groups, versus a concentrated period of treatment is that by Marilyn Bates. To examine the cognitive and affective potential of group counseling, Bates set up three groups: control, traditionally counseled group (one meeting per week for thirteen weeks), and an accelerated counsel group (two meetings in two days for a total of thirteen hours). The traditionally counseled group was significantly different from the control and the accelerated groups in cognitive, behavioral, connative, and acculturative outcomes. On the subscore, acceptance of others, the traditionally counseled group proved to be significantly different from both the control and the accelerated groups.[26] As members of the group show greater understanding for one another and acceptance of others in the group, barriers to friendship should be reduced and the amount of involvement with others increased. In a study of group counseling in which the subjects were below-grade-level readers, Schmidt found that the counseling group not only made significantly better reading improvement than the control but also made significant change in sociometric rankings.[27] Of particular interest was that Schmidt used two treatment levels plus a control. One treatment was the counseled group which included no reading

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26. Marilyn Bates, "A Test of Group Counseling," Personnel and Guidance Journal, 46 (April, 1968), 752.

27. Robert Andrew Schmidt, "Effects of Group Counseling on Reading Achievement and Sociometric Status," Dissertation Abstracts, 30 (1969), 1406A.

improvement materials. The second treatment was based on the SRA Reading Laboratories materials. The counseled group was compared to this group which devoted its entire time to reading improvement and to the control. The counseled group not only surpassed both of these groups in reading improvement but also in the growth of a sense of community as reflected in sociometric analysis that indicated that more members had more friends in the counseled group.

Of the ways by which these and other effects of group participation may be realized, this study is concerned with social interaction among the group members. About interaction, Anderson says, "Of all the factors which impinge on a counseling group none is more pervasive than the interaction among group members."[28] It is this pervasive quality that is significant for this study. For the realization of advisory group purposes 1) establishing a home base, 2) providing a place for dialogue, and 3) building a feeling of community are all dependent upon interaction among the members of the group.

This relationship between interaction and purposes 1, 2, and 3 may be seen in the study reported by Porter above. In that study, Porter found that a significant relationship exists between expressed satisfaction, comparable to a

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28. Alan R. Anderson, "Group Counseling," Review of Educational Research, 39 (April, 1969), 216.

feeling of community, and the amount of group-oriented participation, or interaction.[29]

The dissertation referred to previously by Silluzio also bears on this relationship. His study compared students who attended all classes together to those who had few classmates in common. Measuring their attitudes towards peers and teachers, another measure of community feeling, Silluzio found significant differences favoring those students interacting throughout the school day.[30]

Further evidence that interaction is related to growth toward purposes 1, 2, and 3 is obtained from Borgatta and Bales.[31] This study was designed to assess the possibility of predicting interaction rate and patterns in groups constituted from individuals previously measured for interactional rate and pattern. The finding of that study pertinent to the relationship in question was that the quality of performance, as measured by the supportive categories of the Bales systematic observation model (categories 1, 2, and 3) is directly related to the rate of interaction. The supportive categories in Bales's system measure feelings of solidarity, helpfulness, acceptance, and satisfaction. These characteristics are associated, usually, with such feelings as community, home base, and people you can talk to. Thus,

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29. Porter, p. 130.

30. Silluzio, p. 902B.

31. Edgar F. Borgatta and Robert F. Bales, "Interaction of Individuals in Reconstituted Groups," Sociometry, 16 (December, 1953), 302.

measures of the rate of interaction should reflect the existence of these characteristics.

In another study co-authored by Bales, the authors found that when individuals in a group are ranked in the order of the number of acts they initiate, they will also tend to be ranked by the number of acts they 1) receive, 2) address to specific other individuals, and 3) address to the group as a whole.[32] Thus, measures of change in interaction rate (acts initiated plus acts received) and measures of change in interaction pattern (who said what to whom) should measure whether the advisory groups show growth toward being a place where dialogue can occur.

Summary

The members of groups that are experiencing positive growth toward achieving solidarity and a sense of belonging may be characterized as 1) working harmoniously with others, 2) having attitudes similar to other group members, 3) having many friends within the group, 4) identifying with the group, 5) having greater tolerance for others, and 6) having more positive attitudes toward the group. These characteristics can be measured separately, but they also can be measured, indirectly, by examining an element basic to them all.

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32. Robert F. Bales, Fred L. Strodtbeck, Theodore M. Mills, and Mary E. Roseborough, "Channels of Communication in Small Groups," American Sociological Review, 16 (August, 1951), 468.

Interaction in a group, as behaviors to which some kind of response is made, is that common element. Previous research shows that measurements of interaction reflect, for example, change in attitudes toward peers, in the quality of group relationships, and in attitudes toward the group. By measuring changes in interaction, rate and pattern, in the advisory groups, growth toward or away from purposes 1, 2, and 3 may be demonstrated.

CHAPTER III

COLLECTION OF THE DATA

Introduction

Chapter III of this study is concerned with the hypotheses which were used to detect growth toward or away from the selected advisory group purposes and the process and techniques used to gather data to evaluate those hypotheses.

Eleven hypotheses were proposed as criteria to evaluate movement in the advisory groups. These hypotheses were phrased in terms of various aspects of interaction and as a group were intended to provide one or more measures of growth in the three selected advisory group purposes.

The design of this study was selected to maximize the degree of interpretability. In nonlaboratory situations, such as in this study, the possibility of variables intervening in the treatment effect is great. When variables intervene in the treatment and are not recognized as such, the degree of interpretability is decreased. The time-series design, as described by Campbell and Stanley,[1] offers the greatest

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1. Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research (Chicago: Rand McNally & Co., 1963), p. 41.

opportunity to minimize unrecognized intervention under the conditions of this study.

As discussed in Chapter Two, interaction is proposed as a phenomenon which reflects change in the group. The Bales model, Interaction Process Analysis, has received wide use and was developed for use in small groups. Other models of interactional analysis have been developed for teacher-pupil, labor-management, or client-counselor interactions. The present discussion will examine the Bales model in general descriptive terms and in terms related to level of interpretability that may be expected when using this model.

The procedures used to sample the population are described in this chapter.

The final section of this chapter outlines the timetable for data collection, describes the unit of datum to be recorded, and describes the recording technique.

A. Hypotheses

The hypotheses of this study consist of two basic types: those related to change in rate and those related to change in pattern. Change in rate signifies that individuals interact more or less. Change in pattern refers to three processes. One, the distribution of the individual's total interaction among the categories may change. For example, as a result of consistent reinforcement, the proportion of his total interaction that an individual devotes to Attempted Answers may increase. Two, when an individual's "turn" in

interaction exceeds a single unit, the second and succeeding units may be classified in the same category as the first unit or they may be distributed among other categories. At a point in time, it is possible to determine the proportions of the succeeding interactions distributed among the categories. At a second point in time, the proportions of succeeding interactions may indicate that some categories have become more actively used and some less. This change in the distribution of acts, among categories, which succeeds initial acts is the second type of change in interactional pattern. And three, when a first individual temporarily discontinues his interaction, a second individual begins his interaction. At one time, it is possible to determine proprotions for the distribution of responses made by the second individual. At another time, the distribution of responses among the categories may change. This change in the distribution of responses by a second individual is the third type of interactional change in pattern.

Hy1 Of the total number of interactions, that proportion made by the advisor per unit time will decrease across time in the group situation as measured by the sum of interactions in all categories of Interaction Process Analysis.

Hy2 The total number of interactions by the group member per unit time will increase across time in the group situation as measured by the sum of interaction in all categories of Interaction Process Analysis.

Hy3 The variance in the proportion of units of interaction by each group member will decrease across time in the group situation as measured by the sum of interactions in all categories of Interaction Process Analysis.

One measure of success in achieving purposes 1, 2, and 3 of the advisory groups is change in rate of interaction. As individuals meet as a group for a period of time, friends will be made or, perhaps, enemies will be made. It would be quite unusual if no change occurred in the degree of personal involvement. A consequence of change in involvement is the degree to which one interacts with others in the group. Some individuals should receive more interaction and some less.

If the advisory group is to become a home base (purpose 1), a place where dialogue can take place (2), and a community (3), then friendships must be made, trusts established, and interpersonal barriers dissolved. The studies by Porter and Silluzio would indicate that these characteristics are related to increased rates of interaction. Hypothesis 2 is designed to measure this.

Hypothesis 3 is designed to test the assumption that to the degree interaction is dominated by one individual or a few individuals, the realization of the advisory group purposes will be repressed. Or, the feeling that the advisory is a place where discussions of personal relevance can occur will not develop when one individual or one group of individuals command a share of the interaction out of proportion to their numbers. The advisory group purposes will be met as all individuals share equally.

Hypothesis 1 tests an aspect of Hypothesis 3. That is, some individuals must interact less, some more, if the variance between individuals is to decrease. Since the advisor, in the initial group meetings, should play a primary role in structuring the group activities and then allow this role to be assumed by the group members as they gain experience in the group process, the proportion of the total interaction made by the advisor should decrease across time.

Hy4 The proportion of the advisor's interaction per unit time devoted to the categories 1-3, Positive Reactions, will increase across time in the group situation as measured by the sum of interaction in categories 1-3 of Interaction Process Analysis.

Hy5 The proportion of the advisor's interaction per unit time devoted to the categories 10-12, Negative Reactions, will decrease across time in the group situation as measured by the sum of interaction in categories 10-12 of Interaction Process Analysis.

Hy6 The proporiton of group member interaction per unit time devoted to the categories 1-3, Positive Reactions, will increase across time in the group situation as measured by the sum of interaction in categories 1-3 of Interaction Process Analysis.

Hy7 The proportion of group member interaction per unit time devoted to the categories 10-12, Negative Reactions, will decrease across time in the group situation as measured by the sum of interaction in categories 10-12 of Interaction Process Analysis.

A second measure of success in achieving advisory group purposes 1, 2, and 3 is change in pattern. Hypotheses 4, 5, 6, and 7 were designed to test that change in pattern described above as increase or decrease in the rate of an individual's interactions within a given section of categories.

More fully, as time spent in a group increases the proportion of an individual's total interaction devoted to one of four sections of Bales's system will change. For example, when a number of individuals meet for the first time, one would expect the number of questions (Questions), in proportion to other sections, to be high. But, as they become acquainted and become more secure with one another, the proportion of interaction devoted to questions should decrease. As the interaction devoted to questions decreases, the proprotion of interaction devoted to other sections should increase.

Hypotheses 4 and 5 represent the test of a specific case of the measure of success discussed above. The critical role of the advisor in the advisory groups is developing a climate conducive to movement toward purposes 1, 2, and 3. By interacting in the categories of Section D, Negative Reactions, the advisor can create a situation entirely unsuited for the friendly, open atmosphere necessary for a home base and community to develop. Change in the attention devoted to Sections A and D should reflect the affective direction.

The members of the group perform a function in setting the group climate at least as critical as the advisor's. The attitudes toward group life, toward other group members, toward the advisor, and the changes in these attitudes as the group continues will be reflected in the positive or

negative nature of the members' reactions (Sections A and D). Success in moving toward purposes 1, 2, and 3 should be facilitated by proportionate increase in positive reactions. As positive reactions (supportive comments, help, and agreement) increase, negative reactions (disagreement and antagonism) should decrease. Hypotheses 6 and 7 measured this change.

> Hy8 The proportion of member proactive interaction per unit time in categories 4-6, Attempted Answers, which follows categories 1-3, Positive Reactions, will increase across time in the group situation as measured by Interaction Process Analysis.

An act of proaction is defined by Bales as, "Very simply, an act which is a direct continuation by the same member who has produced the last act. . . ."[2] With reference to Hypothesis 8, this means that, across time, the number of times an individual commits an act of answering (categories 4-6) which follows his act of positive reaction (categories 1-3) will increase.

Research by Bales shows that a large part of the time when an individual interacts that action consists of a sequence of acts rather than a single act.[3] The acts succeeding the initial act are proactive acts as defined above. These proactive acts are important indicators of the success of the advisory groups in movement toward purpose. For, as

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2. Robert F. Bales, "The Equilibrium Problem in Small Groups," Samll Groups: Studies in Social Interaction, A. Paul Hare, Edgar F. Borgatta, and Robert F. Bales, eds., Revised edition, (New York: Alfred A. Knopf, Inc., 1965), p. 449.

3. Ibid., p. 452

the individual finds in the advisory group a place where he may receive support and friendship, his need to defend himself or withdraw inwardly decreases. His proactive acts should reflect this move toward a greater sense of security in an environment that offers acceptance and support. Hypothesis 8 is designed to test the case of change in proactive acts of Attempted Answers (Section B) following initial acts of Positive Reactions (Section A).

Hy9 The proportion of member reactive interaction per unit time in categories 4-6, Attempted Answers, which follows categories 10-12, Negative Reactions, will increase across time in the group situation as measured by Interaction Process Analysis.

Hy10 The proportion of member reactive interaction per unit time in categories 10-12, Negative Reaction, which follows categories 7-9, Questions, will decrease across time in the group situation as measured by Interaction Process Analysis.

HY11 The proportion of member reactive interaction per unit time in categories 10-12, Negative Reactions, which follows categories 4-6, Attempted Answers, will decrease across time in the group situation as measured by Interaction Process Analysis.

In contrast to proaction, Bales defines the reactive act as, "an act which follows immediately the last act of another member. . . ."[4] Thus, a reactive analysis indicates what type of statements are made by one individual in direct response to a second individual.

As the advisory groups become what purposes 1, 2, and 3 outline they should, we may expect that the individual would feel, toward others and toward himself, greater similarity

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4. Ibid., p. 449.

in attitudes, more tolerance and understanding, more respect, more worth for the individual, and more support. Hypotheses 9, 10, and 11 are designed to test whether these effects occur.

Specifically, Hypothesis 9 is designed on the assumption that by reacting to the supportive, tolerant atmosphere created as operative group practices become parallel to the stated purposes 1, 2, and 3 a member will perceive those acts categorized as Negative Reactions constructively, not destructively, and, hence, a member's responses will be constructive responses. One of the constructive sections is Attempted Answers. Thus, this hypothesis will measure whether the individual perceives the atmosphere of the group as increasingly supportive and moving toward a feeling of community.

Hypothesis 10 tests a different aspect of the same process. An increasingly supportive environment should reduce the need, in the individual, to assert or defind his status. Responses in Section D, Negative Reactions, are characterized as responses designed to defend the self, actively through hostile behavior or passively through withdrawal or denial of help. When the rate of response in Section D decreases, we have some evidence that the group is becoming a more supportive environment.

Likewise, Hypothesis 11 tests whether the environment produces enough support from emerging feelings of community

to reduce the level of negative reaction to Attempted Answers. In a situation in which the individual feels lack of support or self-worth, he is likely to respond to opinions, suggestions, and offers of information (the categories of Attempted Answers) as though they were personally threatening. On the other hand, in those situations where the individual senses support for himself and others, Attempted Answers are more likely to be perceived as helpful. The response may be measured as a diminution of negative reaction. By measuring for decrease in rate of negative reaction to Attempted Answers, we should obtain some indication of movement toward purposes 1, 2, and 3.

Design

Data for evaluation of the hypotheses of this study were collected by applying the Bales Interaction Process Analysis category system to a random sample of the twenty-four advisory groups at P.K. Yonge Laboratory School. The sample groups were observed (O_x) three times on three occasions; at the beginning of the school year (O_1, O_2, and O_3), as near as possible the school year mid-point (O_4, O_5, and O_6), and at the end of the school year (O_7, O_8, and O_9). The two-week period immediately after the school year begins and before it ends was recognized as either a period of reintegration into the school routine or deintegration as graduation and summer activities approach, and, thus, no observations were made during these periods.

D.T. Campbell and Julian Stanley's notation for research design is "X will represent the exposure of a group to an experimental variable or event, the effects of which are to be measured; O refers to some process of observation or measurement; the Xs and Os in a given row are applied to the same specific persons. The left-to-right dimension indicates the temporal order, and the Xs and Os vertical to one another are simultaneous. . . . a symbol R, indicating random assignments to separate treatment groups, is necessary."[5]

Following this notation model, the design for this research appears as follows:

$R \quad O_{11} \; O_{12} \; O_{13} \quad X_1 \quad O_{14} \; O_{15} \; O_{16} \quad X_1 \quad O_{17} \; O_{18} \; O_{19}$

$R \quad O_{21} \; O_{22} \; O_{23} \quad X_2 \quad O_{24} \; O_{25} \; O_{26} \quad X_2 \quad O_{27} \; O_{28} \; O_{29}$

$R \quad O_{31} \; O_{32} \; O_{33} \quad X_3 \quad O_{34} \; O_{35} \; O_{36} \quad X_3 \quad O_{37} \; O_{38} \; O_{39}$

$R \quad O_{41} \; O_{42} \; O_{43} \quad X_4 \quad O_{44} \; O_{45} \; O_{46} \quad X_4 \quad O_{47} \; O_{48} \; O_{49}$

$R \quad O_{51} \; O_{52} \; O_{53} \quad X_5 \quad O_{54} \; O_{55} \; O_{56} \quad X_5 \quad O_{57} \; O_{58} \; O_{59}$

$R \quad O_{61} \; O_{62} \; O_{63} \quad X_6 \quad O_{64} \; O_{65} \; O_{66} \quad X_6 \quad O_{67} \; O_{68} \; O_{69}$

Comparisons of interactional data in regard to the hypotheses were made for all pairwise relationships, assuming significant F ratios. Change was expected in the comparisons of data from O_3 and O_4, O_6 and O_7, and O_3 and O_7. Change was expected to appear between these comparisons because the treatment, the totality of experiences in the group, would have the greatest amount of time to effect a

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5. Campbell and Stanley, p. 6.

change in the parameters. No more than ten school days chould elapse between O_1 and O_3, between O_4 and O_6, and between O_7 and O_9. However, at least three months should elapse between O_3 and O_4 and between O_6 and O_7 and, at least six and one-half months should elapse between O_3 and O_7.

This design is similar to that referred to by Campbell and Stanley as the time-series design.[6] In their description of it as a quasi-experimental design, it is subject, potentially, to two of the eight sources of internal experimental invalidity. The discussion of validity or invalidity by Campbell and Stanley refers to experimental design, not to the instrument. In this sense, they distinguish between two types of validity, internal and external. A design that is perfectly valid, internally, possesses no factors ". . . which by themselves could produce changes which might be mistaken for the results of X. . . ."[7] Few designs achieve perfect internal validity; rather different designs are internally valid to different degrees. A design that is perfectly valid, externally, contains no factors which ". . . represent a potential specificity of the effects of X to some undesirably limited set of conditions."[8] Thus, to the extent that a design is externally valid, the results may be generalized to the larger, untested universe. Logically, no design may be shown to be

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6. Ibid., p. 40. 7. Ibid., p. 16 8. Ibid., p. 17.

perfectly valid, externally.[9] However, some designs may be shown to be more valid, externally, than others.

The first of the two sources of internal invalidity discussed by Campbell and Stanley in relation to the "time series" design is history.[10] Theoretically, as the length of time between observations becomes greater, the effects of history or the possibility of some external event occurring which will influence the experimental outcome also becomes greater. In the present study, eight calendar months would elapse in which the subjects as classmates in the same school would have a great deal of opportunity for interaction outside the limits of the advisory group. This effect would be attenuated somewhat by the nonbiased nature of the selection process, as described in the section on sampling procedures.

The second of these variables, instrumentation, did not appear as serious for the present study as others.[11] In studies designed as "time series," the principal source of invalidity due to instrumentation stems from the variability of the measuring device. When using observation techniques, the observer is that source of variability. Being aware of this, the author minimized this effect by developing observer skills as described above.

Campbell and Stanley identify four factors which influence the degree of external validity in experimental

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9. Ibid., p. 5. 10. Ibid., p. 39. 11. Ibid., p. 41.

design.[12] Of these four potential sources, three are mentioned as possibly operative in the "time-series" design.

When the pretest sensitizes the subjects to the treatment, the effect of the treatment is modified. Campbell and Stanley call this interaction of testing and treatment.[13] In this study, the pretest consisted of three episodes of nonparticipatory observation. The treatment consisted of the activities of the advisory group and the opportunities for interaction found there. For testing and treatment interaction to be operative, as a source of invalidity, the nonparticipatory observation must interfere with or influence the activities or opportunities for interaction. Since, the subjects in this study, as students in the University of Florida laboratory school, were to be frequently observed in class and would not be aware that the author was observing for any different reasons than ordinary observers, there was little reason to suspect that treatment and testing would interact in this study.

Studies conducted, in the past, with the population of students of the P.K. Yonge Laboratory School have been limited by the nonrepresentative quality of that population. In the past few years, efforts have been made to make the student body more representative of populations at least as large as the state school-age population. Statistics on the P.K. Yonge School population now indicate that no significant

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12. Ibid., pp. 5-6.

13. Ibid., p. 18.

difference exists between those students and the statewide population of school-age students on the basis of I.Q. and racial composition. On the basis of socio-economic status some difference exists. In relation to the statewide population, the P.K. Yonge School population is overrepresented by the higher ranks and the lower ranks and underrepresented by the middle and lower-middle ranks. This is mentioned in regard to Campbell and Stanley's second source of external invalidity: the interaction of selection and treatment.[14] It has been observed, in some studies, that factors of selection lead to differential capacity to respond to or deal with the treatment. Since, the subjects in this study were not selected on any a priori notions of ability or attitude, this interactive effect was to be eliminated.

Campbell and Stanley propose one more variable which is sometimes influential in the "time-series" design.[15] Reactive arrangements are those conditions of the experimental environment which influence the outcomes and cause an inaccurate interpretation of the treatment effect. In a study in which data are being collected by observing subject behavior, for example, the observer may disturb the true effect of the treatment if his behavior is so distractive that it alters the activity or interaction in the group. Despite all efforts, testing conditions will have some effect. It was proposed that they would be minimized if

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14. Ibid., p. 41.

15. Ibid., p. 41.

1) the observer attends more group meetings than is necessary to gather data for the purpose of desensitizing the subjects to his presence, 2) data recording is accomplished unobtrusively, 3) testing phases of the experiment occur at the sites normally used during the treatment phases, and 4) the observer, otherwise, makes his presence unobtrusive.

The ability to generalize the results of this experiment were to be limited by one more factor--variance of treatment. The process within each advisory group was determined by the advisor. Since this was the first year of this plan and the first effort in this area for most advisors, a great deal of between-group difference was expected in treatment. Each advisor in the sample was asked to prepare a 100-word statement describing the activities in his group that were intended to produce movement toward purposes 1, 2, and 3 of the advisory groups.

The administration of the school had foreseen that this might be problematic and scheduled a series of workshops for the advisors. These were voluntary, one meeting per week, under the direction of the guidance counselor. It was not intended that these workshops standardize group process and activity. The administration expected that the advisors would gain insight into the relationships between group behavior and the purposes set forth for the groups. The success of the treatment was to be, in part, a function of how well the advisors understood those relationships.

Instrumentation

A number of category systems have been developed for the systematic observation of behavior. Simon and Boyer describe these systems as ". . .'shorthand' methods for collecting observable objective data about the way people talk and act. They make possible a relatively simple record of what is happening but they do not record what is being said. . . . These systems are made up of sets of categories of behaviors."[16] These systems vary in the type of behavior they observe, the number of individuals that may be observed, the materials required to record observations, and in several other ways.

The system developed by Robert F. Bales is distinct for its intent to observe behavior in small groups. Most category systems are intended for use in the teacher-pupil environment. Bales defines the small group as "any number of persons engaged in interaction with each other in a single face-to-face meeting or a series of such meetings, in which each member receives some impression or perception of each member distinct enough so that he can, either at the time or in later questioning, give some reaction to each of the others as an individual person, even though it be only to recall that the other was present."[17] Operationally, Bales

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16. Anita Somon and E. Gil Boyer, eds., Mirrors for Behavior (Philadelphia: Research for Better Schools Inc., 1967).

17. Bales, Interaction Process Analysis, p. 33.

says groups of two and twenty are possible, and even larger groups are not necessarily rulled out.[18]

The twelve categories in Bales's Interaction Process Analysis are "meant to be completely inclusive in the sense that every act which can be observed can be classified in one positively defined category."[19] The categories in Bales's instrument are:

1.	Shows Solidarity[20]	
2.	Shows Tension Release	Positive Reactions
3.	Agrees	
4.	Gives Suggestion	
5.	Gives Opinion	Attempted Answers
6.	Gives Orientation	
7.	Asks for Orientation	
8.	Asks for Opinion	Questions
9.	Asks for Suggestion	
10.	Disagrees	
11.	Shows Tension	Negative Reactions
12.	Shows Antagonism	

Development of the present set of twelve categories was begun in 1946. Bales sought to formulate a set of general purpose categories for observation and analysis of the small group for the final goal of "developing a more adequate body of theory relevant to the analysis of full-scale social systems."[21] The process of selecting categories was as much empirical as theoretical. Initial observations were made with no specific category system in hand. The observers merely attempted to categorize interaction as it occurred. From the record of interaction, categories

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18. Ibid., p. i.
19. Ibid., p. 35.
20. Ibid., p. 177-195.
21. Ibid., p. iii.

which were obvious repeaters formed the first category system observers took into the field. From repeated field testing and subsequent revisions, twelve major revisions, the "final" set of twelve was produced.

For this instrument, or any instrument, to provide data concerning change in rate and pattern of interaction that may be accurately interpreted, certain criteria must be met. David Fox describes five criteria that are necessary.[22]

Objectivity is described by Fox as "the extent to which the data obtained are a function of what is being measured."[23] When systematic observation instruments are being used, objectivity is a question of inter- and intra-observer consistency. The process of developing observer consistency is described by Bales in Interaction Process Analysis and is essentially practice using the instrument.[24] In an article, Borgatta and Bales present data supporting the possibility of achieving consistent observer behavior.[25] The data are presented as Pearsonian correlations by category and range from .65 in category 8 to .98 in category 1. The overall correlation was .92. Objectivity in this case, is a function of practice and understanding of the explanations of

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22. David J. Fox, The Research Process in Education (New York: Holt, Rinehart and Winston, Inc., 1969), p. 352.

23. Ibid., p. 380.

24. Bales, Interaction Process Analysis, p. 85-115.

25. Edgar F. Borgatta and Robert F. Bales, "The Consistency of Subject Behavior and the Reliability of Scoring in Interaction Process Analysis," American Sociological Review, 18 (October, 1953), 569.

behavior appropriate for each category. The author, as sole observer, expects to develop these skills through memorization of subject code numbers and categorical definitions and in group observation practice for no less than 50 hours. Intra-observer reliability will be calculated by taping the experimental group sessions, performing the categorization on a randomly selected sample (25 percent) on two separate occasions, and computing correlation coefficients.

The second criterion by which one may evaluate the data-gathering plan for interpretability is appropriateness. Fox defines this factor as "the extent to which the respondent group can meet the demands imposed by the instrument."[26] Most category systems for the systemic observation of interaction make no demands upon the observed except that they stay within sight of the observer. These systems are capable of recording nonverbal as well as verbal behavior. Since the subjects in this study were not required to meet as a group for the purpose of providing a source of data for this study, but for the purposes of the advisory group and the school, the instrument should be appropriate in this instance.

Sensitivity, the third criterion, is the first that is measurable. Fox defines sensitivity "as the ability of the instrument to make the discriminations required for the

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26. Fox, p. 380.

research problem."[27] Acceptable evidence that an instrument is sensitive enough to meet the standard of interpretability is whether or not the results of analysis of data produced by the instrument indicate that significant change has occurred. If no change occurs, the instrument may still be sensitive but will have to be tested in a situation in which change is known to occur or when gross differences are expected. When generalizing from other studies to evaluate the sensitivity of an instrument, it is crucial to be aware that an instrument sensitive to one program or population may not be sensitive to a second program or population.

Complete evaluation of the sensitivity of the Bales system in use in this study will come after the data are analyzed. Significant differences would indicate that it was sufficiently sensitive. If no differences are measured, we may blame the instrument or the experimental treatment. However, we may establish, partially, sensitivity as present in the Bales system by examining studies similar to the present one which have found significant differences. One study which found significant change as measured by the Bales instrument was that by John Kirby.[28] In his study of public school principals, Kirby proved, among other things, that variance in the number of acts per individual that

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27. Ibid., p. 377.

28. John T. Kirby, An Analysis of Certain Aspects of Perception and Behavior Among Principals While Enrolled in a Leadership Course, Doctoral Dissertation, University of Florida, 1957.

observers could categorize on the Bales instrument decreased as time spent in the treatment program increased.[29] It is possible to use this study as evidence for the sensitivity for the Bales instrument in the present because certain parallels may be drawn between the present study and Kirby's study. One, the subjects in both cases were required to meet for reasons other than to supply a source of data for the studies in question. Two, both groups were larger than those usually reported in the literature. And, three, Kirby measured change across a longer (nine months) period of time than other studies using the Bales instrument, as did the present study.

The fourth attribute an instrument must have to be accurately interpretable is reliability. Fox says, "By reliability we mean the accuracy of the data in the sense of their stability, repeatability, or precision."[30] Reliability, when using a systematic observation instrument concerns the degree to which the behavior of the subject is consistent or not subject to gross periodic changes and the degree to which the observer can agree with himself and a second observer when categorizing behavior. Bales chose to deal directly with this problem in an article co-authored with Edgar Borgatta.[31] The authors categorized subject

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29. Ibid., p. 74.

30. Fox, p. 373.

31. Borgatta and Bales, "The Consistency of Subject Behavior and the Reliability of Scoring in Interaction Process Analysis," p. 569.

interaction across time and found that subjects do behave in a manner that is categorically consistent. Since the only operational way to categorize behavior at this time is through observer judgment, reliability of observation technique is finally observer reliability. The second purpose of the article reported above was to present evidence on this question. Those results are reported above under the discussion on the objectivity of the instrument. The procedures that were used in this study to maximize observer reliability are also reported above.

The final criterion of interpretability is validity. Validity is defined by Fox as "the extent to which the procedure actually accomplishes what it seeks to accomplish or measures what it seeks to measure."[32] The extent to which an instrument accomplishes what it seeks to accomplish may be evaluated at several levels of confidence. At the level of predictive validity the researcher has the greatest confidence in the validity of a particular instrument. This type of validity depends upon successful prediction of future behavior that is based on results from the instrument in question.[33] Evidence that this level of validity may be achieved when using the Bales instrument may be drawn from a study by Borgatta and Bales.[34] The authors observed and categorized behavior in a number of groups to establish

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32. Fox, p. 367.

33. Ibid., 375.

34. Borgatta and Bales, "Interaction of Individuals in Reconstituted Groups," p. 302.

baseline rate and pattern data for each participant. By comparing this base data and their theory of interaction, the authors hypothesized various interactional rate and pattern characteristics for groups made when members of the original groups were combined to form different groups. To test their hypotheses, they observed and categorized behavior in the new groups. Results proved that they could predict interactional behavior on the basis of earlier behavior.

A second study which supports the contention that the Bales instrument may be validly interpretable is that by George Talland.[35] Perceiving that most laboratory groups are studied in the process of solving problems, Talland sought to examine interaction in groups whose task was to identify problems rather than solve them. Because they seek more to identify than to solve problems, advisory groups more closely parallel Talland's therapeutic groups--those groups seeking to identify problems--than problem-solving groups. The dimension of interaction which Talland chose to measure was the phase movement, proposed by Bales to be characteristic of interaction in certain types of small groups.[36] Bales theoretically excluded therapeutic groups

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35. George A. Talland, "Task and Interaction Process: Some Characteristics of Therapeutic Group Discussion," Journal of Abnormal and Social Psychology, 50 (January, 1955), 109.

36. Robert F. Bales and Fred L. Strodtbeck, "Phases in Group Problem-Solving," Journal of Abnormal and Social Psychology, 46 (October, 1951), 485.

from demonstrating the phase movement he found applicable to the groups in his study. Talland hypothesized and proved that therapeutic groups do not complete the orientation-evaluation-control phase movements.

Finally, as a test of whether the predicted phase movement occurred in "real" problem-solving groups, as opposed to laboratory groups, Henry Landsberger used Interaction Process Analysis to collect interaction data on twelve labor-management mediation groups.[37] His positive results affirmed the Bales hypothesis of the existence of phases in group interaction.

Application of the criterion of accurate interpretability as defined by Fox to the Bales instrument indicates that results from that instrument may be meaningfully interpreted.

Sampling

The advisory groups were formed when the core teachers for each grade assigned students in that grade to an advisory group. By assigning the first student, alphabetically, to advisory group one, the second student to group two, and so on, the teachers filled six groups per grade with fifteen students each. Gross imbalances in sex or race were corrected to make each group similar to the larger

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37. Henry A. Landsberger, "Interaction Process Analysis of the Mediation of Labor-Management Disputes," Journal of Abnormal and Social Psychology, 51 (November, 1955), 558.

population of P.K. Yonge students. From a total of twenty-four groups, the sample was selected by randomly drawing two groups from the twelfth grade groups, one group from the eleventh grade groups, one group from the tenth grade groups, and two groups from the ninth grade groups. Two groups were drawn from the twelfth and ninth grade groups to include a larger proportion of subjects from the population. Six groups and six advisors produced 96 subjects or one-fourth of the population. Randomness was limited to groups per grade level and students per grade level.

Data Collection

P.K. Yonge Laboratory School began a modular schedule in the fall of 1971. Each module is 30 minutes long, and the school day has nineteen modules. Six school days equal one cycle. That is, on the seventh school day, a student begins to repeat the schedule of the previous 6 school days. The school year is broken into five parts. Each part lasts for five cycles or 30 school days.

Between the idea, the plan, and the implementation compromises frequently occur. A number of factors forced such an occurrence upon the advisory group program. Administrative detail, the need for class meetings, school assemblies, and testing were a few of the impositions upon the time designated for advisory group activities. As planned, the advisory groups met one and one-half hours, twice per cycle

during the first and third parts of the school year. Eleventh and twelfth grade groups met from 11:30 A.M. to 1:00 P.M. and ninth and tenth grade groups met from 1:30 to 3:00 P.M. During the second and fourth parts, advisory groups met one-half hour, twice per cycle, as planned. Eleventh and twelfth grade groups met from 11:30 to 12:00 A.M. and ninth and tenth grade groups met from 1:30 to 2:00 P.M. During the fifth part of the school year, the final 30 school days, the groups were to have met as they did during the first and third parts of the year. However, several considerations required that they meet one-half hour, twice per cycle as they did during the second and fourth parts of the school year.

Twelfth grade groups met the first and fifth days of the cycle. Eleventh grade groups met the third and fifth days of the cycle. Tenth grade groups met the second and sixth days of the cycle. Ninth grade groups met the fourth and sixth days of the cycle. Since the school cycle does not coincide with the calendar week, the calendar days each grade had scheduled for advisory group meetings changed from week to week. Thus, one group did not always meet on Monday, while another met always on Friday (see Figure 1).

The author collected the interactional data as a nonparticipant observer in each of the six groups. Observations took place in the room assigned to each group by the school administration. Although the author was present at all times, the actual data collection took place during the middle twenty-minute

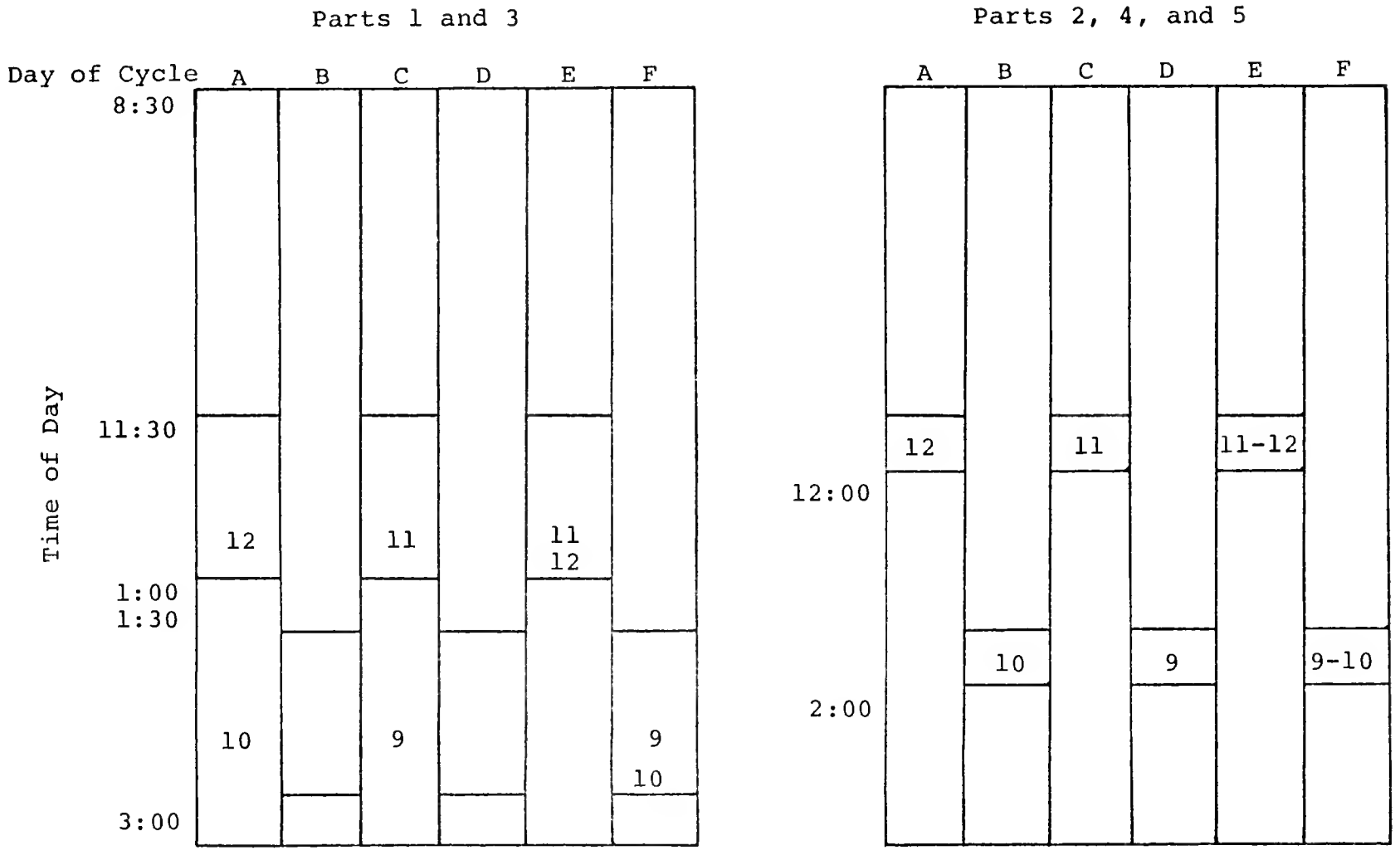

Figure 1. Advisory group schedule.

period of the advisory group's one and one-half hour session, for the first and the second observational periods. Since the advisory groups met only one-half hour per session during the third observational period, data were collected during the middle twenty-minute period of the one-half hour session.

If the groups had met as per the projected plan, 60 minutes of observation data per group per observation period could have been collected within ten school days. As mentioned above, certain factors intervened in the regular focus of the advisory groups on activities directed toward achievement of their purposes. The intervening activities, while not necessarily unproductive with respect to advisory group purposes 1, 2, and 3, were of such a nature as to preclude the collection of observation data. For example, during class meetings, one of the intervening activities, interaction, might occur that would contribute to the growth of community feeling, but the presence of students who were not experimental subjects made that instance inadequate for the observational purposes of this study. Thus, rather than the ten days of data collecting, per observational period, the first observational period lasted twenty-six school days. The second period lasted twenty-one school days and the third lasted twenty-two school days. Instead of three months elapsed time between O_{x3} and O_{x4} and O_{x6} and O_{x7}, the longer data collection period meant that only two months passed

between O_{x3} and O_{x4} and between O_{x6} and O_{x7}. Likewise, only five months passed between O_{x3} and O_{x7} instead of the six and one-half months projected under "Design" in this study. In addition, during the second observational period the sample of twelfth grade advisory groups met to accomplish advisory group purposes so infrequently that it was decided to cease observing and use what data had been collected by the time complete data were collected for the other grades' advisory groups. Thus, for the second observation period, the two twelfth grade groups were not represented in the data, and evaluation of change was based on data from observations O_{x1}, O_{x2}, and O_{x3} and O_{x3} and O_{x7}, and O_{x9}.

A representation of the recording sheet used is shown in Figure 2. The horizontal lines represent time and the vertical lines represent category boundaries. Group interaction was scored by assigning each group member and advisor a code number and recording code numbers beneath the proper category heading. The "unit" to be scored is defined by Bales as "the smallest discriminable segment of verbal or nonverbal behavior to which the observer, using the present set of categories after appropriate training, can assign a classification under conditions of continuous serial scoring."[38] He further says that this smallest discriminable segment is ". . . often . . . a single simple sentence," or that complex sentences always involve more than one score."[39]

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38. Bales, Interaction Process Analysis, p. 37. 39. Ibid.

SHEET_____ GROUP_____ ABSENT_____

DATE_____ TIME_____

1	2	3	4	5	6	7	8	9	10	11	12

Figure 2. Recording sheet.

This formal definition was operationalized in the following ways. A separate unit was scored for an individual when he or she: 1) initiated an interaction, 2) moved from one category of interaction to another without another individual entering the sequence, or 3) extended their interaction in a single category for some length of time.

For example, the conversation--"Where do you go next?" "Math." "That's too bad." "Oh no, I like math."--would be scored as four separate units assigned to the appropriate individuals.

The response--"That was a good guess, but a better answer would have been 'ovoviviparous.' What do you think?"--would have been scored in three categories (I, VI, and VIII). All three units would have been attributed to the same individual and scored as directed to the same second individual.

An example of the third type of scoring decision might look like this: "I think the mini-courses are not very good because they are so short. We have so little time to get into the subject that just as our interest is built, it is time to get back to the regular program. Also, the interests of the instructor in the subject are much more developed than ours and he, consequently, does not deal with aspects that the novice finds troublesome." This interaction would receive three separate scores in the first category for the individual initiating the interaction. The number

of separate scores within a single interaction of some duration is determined by Bales's observation that to achieve maximum validity, a new score should be entered every four seconds.[40] Thus, in an interaction of twelve seconds duration, three scores would be entered. Operationally, the time is estimated.

To collect proactive and reactive data, it was necessary to record, beneath a category heading, the code number of the speaker and the code number of the receiver. Bales has adopted the notation "o" to represent the group as a whole, as speaker or receiver, and "x" to represent some general or specific other outside the group, and we used the notation.[41] Except for the one change, Bales's category system was used as defined in the appendix to Interaction Process Analysis.[42]

Conclusion

Eleven hypotheses were proposed to measure the direction of growth toward selected purposes in the advisory groups at the P.K. Yonge Laboratory School. A random sample of these groups were selected to provide data for hypothesis evaluation. For this study, the unit of datum was that defined by Robert F. Bales in Interaction Process Analysis. The data were gathered by systematically observing the sample over an eight-month period and categorizing the units of interaction with respect to the Bales model.

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40. Ibid., p. 39.
41. Ibid., pp. 89-90.
42. Ibid., pp. 177-195.

CHAPTER IV

DATA ANALYSIS

Chapter IV of this study is concerned with statistical treatment and presentation of data gathered to evaluate the hypotheses proposed in Chapter III. The resulting values were used to detect growth toward or away from the selected advisory group purposes.

The data analyzed in this study consisted of units of interaction as defined by Bales in Interaction Process Analysis.

All hypotheses, except Hypothesis 3 were evaluated using the analysis of variance method. Hypothesis 3, concerning variance change among individuals, was evaluated using a statistic reported in Walker and Lev.[1] This statistic is used in the special case when one wishes to compare the variance at the beginning of the experiment with the variance, in the same group, later in the experiment.

The model selected for use in this experiment is termed the randomized block design. The randomized block design

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1. Helen Walker and Joseph Lev, Statistical Inference (New York: Henry Holt and Co., 1953), p. 190.

$$t = \frac{(\Sigma x_2^2 - \Sigma x_1^2)\sqrt{N-2}}{2\sqrt{\Sigma x_1^2 \Sigma x_2^2 - \Sigma x_1 x_2)^2}}$$

was selected because it allows statistical control of differences between groups. Four general conditions must be met when using analysis of variance. In addition, three criteria specific to the randomized block design must be met.

The general conditions applicable to all models of analysis of variance are: 1) observations are drawn from normally distributed populations, 2) observations represent random samples from populations, 3) variances of populations are equal, and 4) numerator and denominator of F ratio are independent.[2]

Criteria specific to the randomized block design are: "1) one treatment with k = two or more treatment levels, 2) assignment of subjects to blocks so that the variability among subjects within any block is less than the variability among the blocks. The number of subjects and observations within each block must be equal, and 3) random assignment of treatment levels to the experimental units within each block."[3] An exception is made to this randomization procedure when a block consists of one subject who receives all treatment levels and when the nature of the treatment precludes the randomization of order.

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2. Roger E. Kirk, Experimental Design: Procedures for the Behavioral Sciences (Belmont, California: Brooks/Cole Publishing Co., 1968), p. 43.

3. Ibid., p. 131.

The general criteria may be considered in the following ways. The populations from which observations were drawn were the total units of interaction made by the members and advisors of all advisory groups at the P.K. Yonge Laboratory School during any one observational period. For lack of evidence to the contrary, it may be assumed that these units of interaction were distributed normally with regard to categories of Bales's instrument. The observations that were made to produce data may be perceived as random samples of the populations in two respects. One, advisory groups were selected on a random basis. And, two, no "a priori" schedule or criteria were established which determined the particular group session to be used as a data base. In regards to the third general criterion, if populations are normally distributed, then the population variances will be equal. Finally, when observations are randomly sampled from normal populations, the numerator and denominator of the F ratio are independent.

The randomized block design is a common model used in analysis of variance. Kirk, for one, describes it at length in Experimental Design: Procedures for the Behavioral Sciences. In particular, Kirk says this design is quite useful when subject variability may partially obscure the treatment effect. This design controls that source of variability. Thus, differences between groups should not influence the treatment effect across time.

The criteria specific to the randomized block design may be considered in these ways. The present experiment had one treatment, advisory group ambience, and nine treatment levels based on the passage of time as a factor related to change in the groups. Kirk proposes that an acceptable alternative used to reduce within-block variability below that of among-block variability is to expose every subject to all levels of treatment.[4] This was done in the present study. Finally, this study was excepted from the third specific criterion since it is not possible to randomly order the treatment levels of this study, and that is specifically noted as an exception to the criterion.

The results derived from analysis of variance do no more than to indicate the presence or absence of change that is statistically different from chance. Thus, in designs where more than two blocks are used and/or more than two treatment levels are used, a significant value of F will indicate that at least one pair of blocks or treatment levels reflects significant change, but it will not indicate which pair or pairs are significant. In the present study, there are 36 pairwise comparisons between treatment levels and 15 pairwise comparisons between block (i.e., groups) levels. This study was designed to examine change across time, not between groups. Therefore, we were only interested in the pairwise treatment level comparisons. They represent change across time.

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4. Ibid.

If significance was found in the analysis of variance for a particular hypothesis, Tukey's Honestly Significant Difference procedure was used to determine which pair or pairs were significantly different.[5] If no significance was obtained for a particular hypothesis, no further analysis was made nor was necessary. Nonsignificant F ratios derived from analysis of variance indicate that no one of the possible pairwise comparisons involves significant change.

According to Kirk, Tukey's Honestly Significant Difference procedure is designed to test all pairwise comparisons among means.[8] Significance is determined by comparing the difference between the two means being considered and the value derived per the Honestly Significant Difference formula.[6] If the difference exceeds the honestly significant difference, then the change is significant between those two comparison levels. This procedure is simplified by building a matrix composed of the differences among means as described by Kirk.[7]

A necessary prerequisite to the consideration of observational data as an objective basis upon which to judge the hypothesis is the determination of the intra-observer reliability. As described in the earlier section, Instrumentation, intra-observer reliability was determined by repeating

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5. Ibid., p. 88. 6. Ibid. 7. Ibid., 89.

8. Tukey's procedure was used in place of the usual t comparisons because a large number of comparisons had to be made. When many t comparisons are made a few will prove significant by chance alone.

the categorization process on a randomly selected sample (25 percent) of the advisory groups. Audio tapes of the verbal interaction were made on 47 occasions. Each of these sessions was assigned a number (01-47) drawn from a table of random numbers. Entering the table at a different point, the first twelve of these numbers (01-47) were selected as the sample to be used to determine intra-observer reliability. To measure this reliability, the categorization process was repeated on these twelve sessions. Data from that repetition were correlated with data for the same sessions gathered during the original categorization of interaction. Correlations coefficients were calculated for interactions per category and interactions per participant. The data are found in Table 1.

Table 1. Correlation Coefficients for a Sample of Original and Replicated Observational Data

	Data for Group Members	Data for Advisors
Total interaction	.959	.906
Section A	.731	.810
Section B	.870	.633
Section C	.883	.938
Section D	.754	.473

All but two of the correlation coefficients fall within the values Bales found acceptable.[9] Bales accepted

9. Borgatta and Bales, "The Consistency of Subject Behavior

correlations above .65 as indicative of sufficient relationship between two sets of data. The correlation of the original and duplicate data from advisor interaction in Section B is quite near Bales's minimum acceptable level. In the context of eight high correlations, this one relatively low value should not cause much concern. The low value of correlation of advisory interaction in Section D is based on a very small number of interactions. It is actually not valid to compute a correlation based on so few numbers. In general, it must be said that the correlations between the original and duplicate data are of sufficient size as to indicate that the samples came from the same population.

In Hypothesis 1, it was proposed that the proportion of interaction in all categories of interactions made by advisors would decrease as time passed. As the members of the group, including the advisor, become more intimate the need for the advisor to enter interaction should decrease.

To evaluate this hypothesis, that proportion of all interactions which was made by each advisor was computed. These proportions were the data used to determine the sums of squares necessary to calculate F ratios from the analysis of variance method.

If change in interaction rate was to have occurred, it was expected between observational periods O_3-O_4, O_6-O_7, and

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and the Reliability of Scoring in Interaction Process Analysis," p. 569.

O_3-O_7. Between these three pairs of observational periods the greatest amount of time passed and, theoretically, the greatest opportunity for the treatment, advisory group interaction, to have its effect.

A portion of the power of the time series-design derives from the repeated inter-treatment observations. It is assumed that no significant differences will occur between pairwise observations drawn from O_1, O_2, and O_3 or O_4, O_5, and O_6 or O_7, O_8, and O_9.

In Table 2, and in the following tables, a significant F value will be indicated at the .05 level. Thus, an F value obtained that is equal to or greater than 2.18 will be judged significant.

The proportions, X, which served as data in these and following calculations may be found in the Appendix. Table 2 represents the summary presentation of the analysis of variance treatment of advisor rate.

Table 2. Change in Rate of Advisor Interaction

Source of Variance	Sum of Squares	df	Mean Squares	F
Treatment	.094506	8	.011813	.760
Blocks	.622010	5	.124402	7.999*
Residual	.622075	40	.015552	
Total	1.338590	53		

$F_{.05;8,40}=2.18$.
*$p < .05$.

The F ratio for that portion of variance attributable to change between treatment levels is not significant. Non-significance indicates that no one of the 36 pairwise comparisons possible between treatment levels involves a significant change. There is no need to look at the separate pairwise comparisons via Tukey's method.

The F ratio derived for variance due to differences between blocks is significant. Significance between groups indicates that real differences exist between advisors with respect to their rate of interaction. The present study was not designed to examine differences between groups or advisors, only between treatment levels (i.e., across time). The fact that differences between groups and advisors may influence the treatment effect is the reason for the development of the block design. Effects due to blocks (i.e., groups or advisors) are partitioned out of effects due to columns (i.e., treatment)--the result of which is a more accurate assessment of effect due to treatment.

To facilitate the reader's perceptions of change in advisor rate of interaction and of change in the succeeding hypotheses, the data are presented graphically. Graphic display of the data may contribute, at times, information not contained in summary statistical tables.

The graph of the mean proportions of advisor interaction appears in Figure 3.

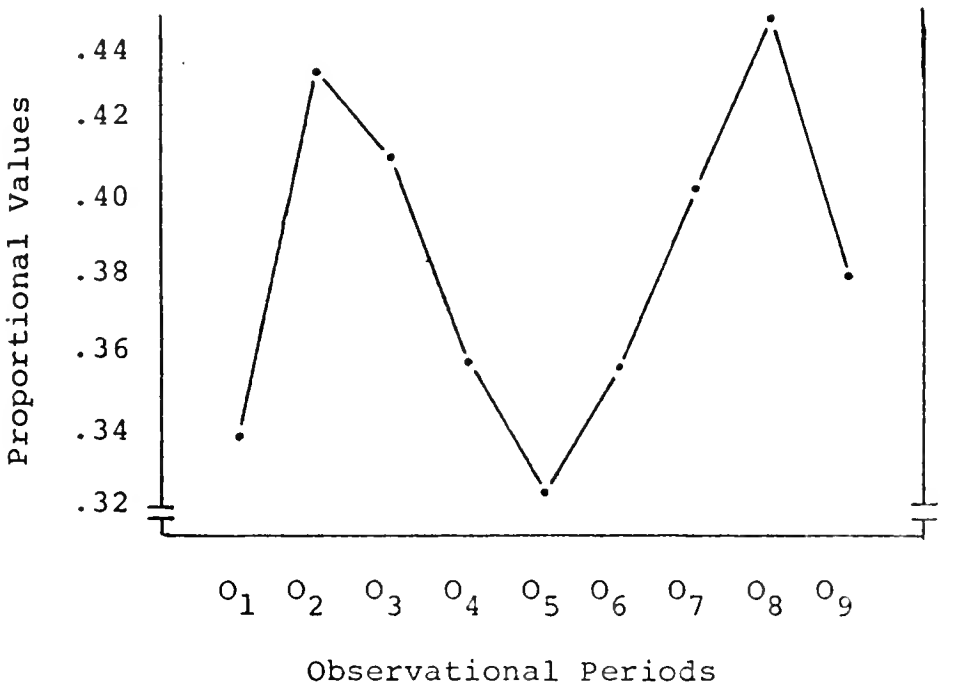

Figure 3. Mean values for that portion of all interaction which was made by advisors.

A line graph of the mean proportions of advisor interactions per observational period does not offer any clear-cut pattern. It is possible, statistically, to examine this line for trend, but only where the F value for treatment variance is significant.

Statistical and graphic data presented for Hypothesis 1 do not offer any evidence that change has occurred. As measured by the Bales Interaction Process Analysis model, advisor interaction in the advisory group environemnt did not decrease in rate during the experimental period.

Hypothesis 2 was proposed to determine whether or not change occurs in the rate at which the group members enter interaction. This hypothesis is the complement of Hypothesis 1. If advisor rate goes down, group-member rate must go up. In addition, if the advisory groups are approaching their avowed purposes of providing a home base, a place where dialogue occurs and a sense of community, then member interaction should increase. And as these goals are neared, interactional increases will follow.

For computational purposes, all member interaction per group was lumped together. The proportion of all interaction made by all members of a group present for any one observation period equaled X. The sums of X in Hypothesis 2 were computed from the proportions of interaction attributable to the group members in each group for each observation period. The values for X which represent the proportion of all interaction initiated by all members of a group may be found in the Appendix.

The summary table for the analysis of variance of Hypothesis 2 is found in Table 3. Based on analysis of variance any change that may have occurred between treatment levels was not significant. As in Hypothesis 1, differences between blocks or groups were significant but not of hypothetical concern to this study. Graphic representation of the data appears in Figure 4.

Table 3. Change in Rate of Group Member Interaction

Source of Variance	Sum of Squares	df	Mean Squares	F
Treatment	.096965	8	.012120	.760
Blocks	.591807	5	.118361	7.421*
Residual	.637987	40	.015949	
Total	1.326759	53		

$F_{.05;8,40}=2.18$.
*$p < .05$.

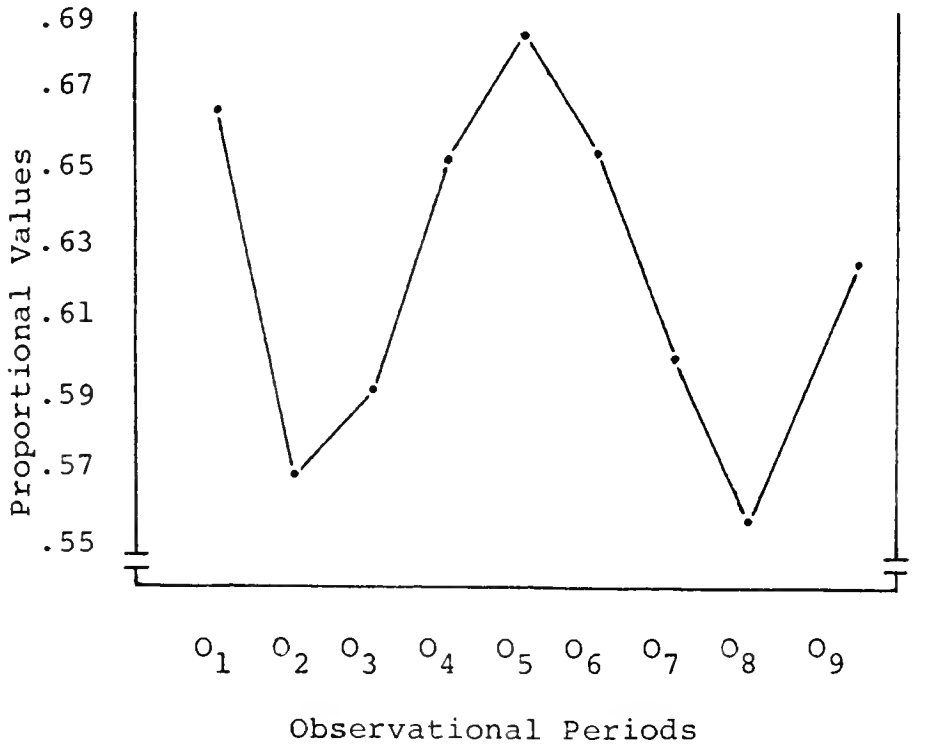

Figure 4. Mean values for that portion of all interaction which was made by group members.

As expected, this graph is a reflection of the line graph of mean proportions from Hypothesis 1. Again, little can be said with regard to general trends in the data. Trend analysis, a posteriori, is not appropriate because the treatment F is not significant.

Analytical results for Hypothesis 2 must be construed to indicate that no change has taken place in the rate at which group members participate in interaction.

The third hypothesis was proposed to examine the possibility that change might occur in the extent to which one group member or a small group of members dominated the conversation. If the situation existed in which the few entered interaction out of proportion to their number, movement toward advisory group goals would be impeded. Social give and take among all members of the group is necessary if the group membership and the total school population are to find in the groups a source of security crucial to the achievement of purpose. A more even distribution of interaction could occur regardless of change in the group member proportion of total interaction.

The raw data used to compute t for Hypothesis 3 were obtained by computing the interaction initiated by each group member as a proportion of the total units of interaction initiated by all members of a group. The proportions were used as the values for X when determining the deviation scores necessary to compute t from the Walker and Lev

formula cited earlier. The results of this computation are found in Table 4.

Negative values for t reflect change from greater variability to less. When this situation obtains, we expect to find more group members participating in the interaction. Or, if every group member is participating, we would expect the total amount of interaction to be spread more evenly among the members. If this were a two-sided test, significant change would be indicated at several comparison intervals. Since change in a particular direction was anticipated, a one-sided test was considered appropriate. On this basis, the only comparison in which significant change occurred was at O_4-O_5 in Group 1. Change was expected at O_3-O_4, O_6-O_7, and O_3-O_7. The decrease in variability of amount of interaction which occurred at this point obviously does not warrant the conclusion that a general decrease in variability occurred. There was no change in the number of units of interaction distributed among the group members over the course of this experiment.

Growth toward purpose in the groups should be, in part, a result of and the cause of a greater number of positive statements. The climate of a group in which the members find support and opportunity for discussion must be one characterized by warm, supportive comments. The purpose of Hypothesis 4 was to determine if significant change occurred in the amount of interaction made by the advisors in Section A, Positive Statements.

Table 4. t Values for the Variability in Number of Units of Interaction Initiated by Group Members

Group	O_1-O_2	O_2-O_3	O_3-O_4	O_4-O_5	O_5-O_6	O_6-O_7	O_7-O_8	O_8-O_9	O_3-O_7
1	-.16486	.27914	1.80831	-3.87970[b]	3.12506	-.40630	.67081	.84139	.65157
2	.47245	-1.63396	1.84059	.19229	-.65946	-.51405	-.85635	.57310	1.34689
3	-.06687	-1.15716	.28832	-1.19726	-.19542	-.44448	2.40152	-.17487	-.96187
4	.34401	-.24651	.12376	1.51024	-.53094	-.32094	2.14182	-.51239	.40466
5	.28455	-.27858	c	c	c	c	4.22620	c	2.01900
6	1.05311	-.31193	c	c	c	c	1.71774	-.81890	.14053

[a] $t=\frac{(\Sigma x_2^2-\Sigma x_1^2)\sqrt{N-2}}{2\sqrt{\Sigma x_1^2 \Sigma x_2^2-(\Sigma x_1 x_2)^2}}$

[b] Significant at .05.

[c] Data not collected.

Proportions were calculated for each advisor which represented that part of the advisor's total interaction categorized in Section A.

These proportions were used as values of X when calculating the sums of squares needed to compute F ratios from analysis of variance.

The summary table for the analysis of variance of Hypothesis 4 is found in Table 5.

Table 5. Change in Rate of Advisor Interaction in Section A

Source of Variance	Sum of Squares	df	Mean Squares	F
Treatment	.013008	8	.001626	1.053
Blocks	.009020	5	.001804	1.168
Residual	.061790	40	.001544	
Total	.083818	53		

$F_{.05;8,40}=2.18$.

$p < .05$.

Neither the treatment F nor the blocks F is significant for this hypothesis. Of 36 possible comparisons, none, particularly O_3-O_4, O_6-O_7, or O_3-O_7, is significant.

Figure 5 displays the mean proportions of advisor interaction categorized in Section A.

Trends which would be supportive of Hypothesis 4 would reflect a net gain in mean proportion of interaction. Neither trends nor F ratios indicate that change has occurred. Based

on analysis of variance and graphic display of observational data no change has taken place in the rate at which advisors made Positive Statements, Section A, in the advisory groups.

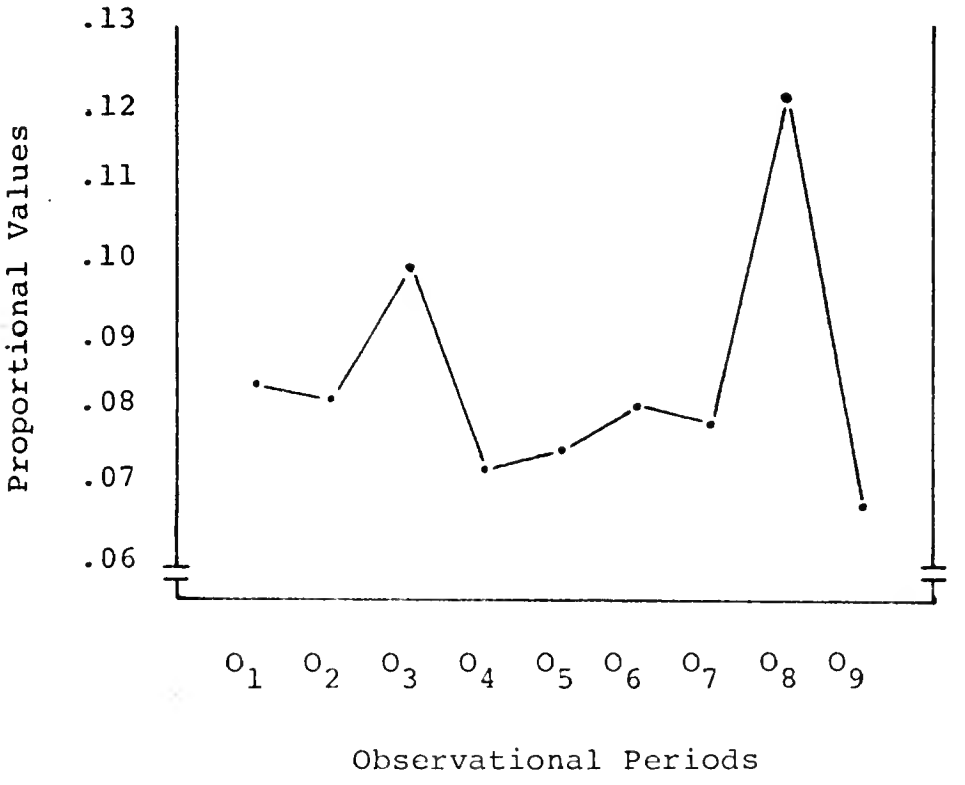

Figure 5. Mean values for that portion of all interaction made by advisors categorized in Section A

A second reflection of growth toward advisory group purpose found in the advisor's interactions is the diminution of rate of Negative Statements, Section D, initiated. As the forces at work producing growth prompt more interaction in the Positive Statement section, they also tend to restrict the initiation of interaction in Section D, Negative Statements. As the group grows toward its purposes, the nonthreatening climate diminishes the personal

requirement to respond in a negative manner. Hypothesis 5 was proposed to detect change in the rate of initiation in Section D by advisors.

Computation is similar to that in Hypothesis 4. Proportions were established for each advisor's rate of interaction in Section D as a part of his total initiated interaction.

These proportions were used as values for X when determining the sums of squares in the analysis of variance. Table 6 is a summary table of the results of analysis of variance for Hypothesis 5.

Table 6. Change in Rate of Advisor Interaction in Section D

Source of Variance	Sum of Squares	df	Mean Squares	F
Treatment	.000531	8	.00006638	.985
Blocks	.000036	5	.00000720	.104
Residual	.002681	40	.00006703	
Total	.003248	53		

$F_{.05;8,40}=2.18.$
$p < .05.$

Nonsignificant F ratios indicate that there was no statistical difference between treatment levels or between groups. Further, this means that no pairwise comparisons would show real change.

A graph of the mean proportions of advisors' interactions categorized in Section D appears as Figure 6.

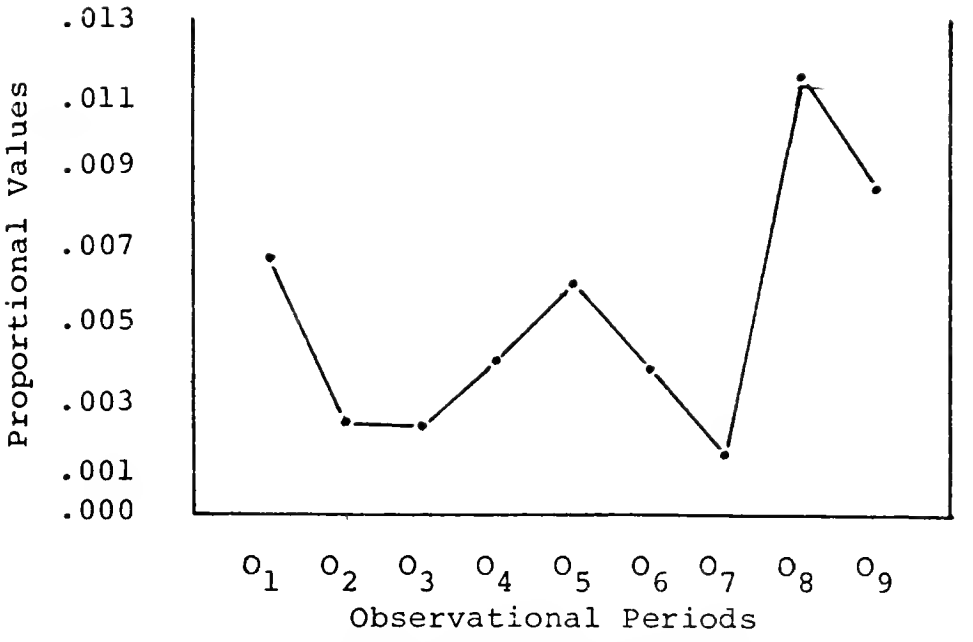

Figure 6. Mean values for that portion of all interaction made by advisors categorized in Section D.

There is an apparent trend toward greater use of verbal behavior by advisors that could be categorized as Negative Statements, Section D. This was not the anticipated trend. During observational periods 8 and 9, the higher percentage of an advisor's total interactions were of a type that reflected tension, disagreement, or defensiveness. The reader, however, must bear in mind that the increase from a mean proportion of .001216 at O_7 to a mean proportion of .011316 at O_8 involves an increase of actual Negative Statements of one to five. This may represent a trend, but the data do not conclusively support that assumption. Indeed, the analysis of variance indicated that this increase is not significant. On available evidence, it must be concluded that no change has occurred in the rate of advisor interaction categorized in Section D.

For the same reasons that advisors were expected to increase their proportion of interaction in Section A, Positive Statements, it was also expected that the group members would increase their participation in Section A. As the members of the group, including the advisor, became more familiar with one another and the anxiety expected in innovative situations was replaced with security, the proportion of Positive Statements initiated by group members should increase. This assumption is reflected in Hypothesis 6.

The proportions used as data in this hypothesis were calculated from the ratio of number of group member interacitons initiated in Section A to the group members' total number of interactions initiated.

These proportions were used as values for X when computing sums of squares for the analysis of variance in Hypothesis 6. The analysis of variance summary table for Hypothesis 6 appears in Table 7.

Table 7. Change in Rate of Group Member Interaction in Section A

Source of Variance	Sum of Squares	df	Mean Squares	F
Treatment	.007633	8	.000954	1.040
Blocks	.013512	5	.002702	2.947*
Residual	.036719	40	.000918	
Total	.057864	53		

$F_{.05;8,40}=2.18$. *p < .05.

The hypothetical expectation at this point was that group members would increase the proportion of their total interaction that was categorized in Section A, Positive Statements. This increase was expected across time. As the treatment F indicates, no significant change occurred in the rate of Positive Statements. The significant F ratio for block effect implies that a real difference existed between the groups. The mean values per group for proportions of total interaction attributable to Section A were significantly different. The randomized block design controlled this source of variation to minimize its influence upon the analysis of treatment effect. Graphically, the data appear in Figure 7.

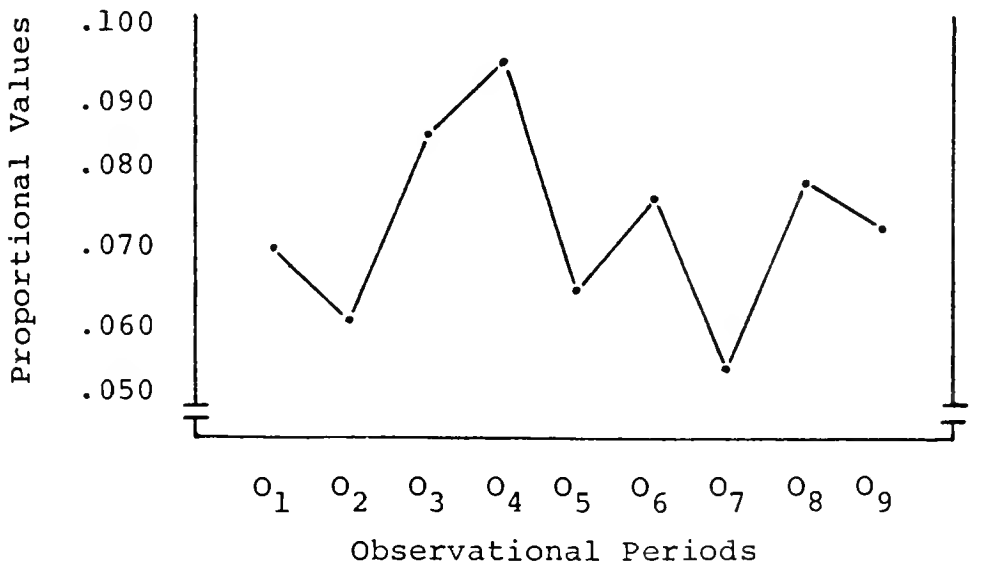

Figure 7. Mean values for that portion of all interaction made by group members categorized in Section A.

The expected trend in Hypothesis 6 was for a net increase in proportions from O_1 to O_9. If any trend is

discernible, it reflects a net decrease in proportion of Positive Statements by group members. It is important to remember that the graphed data presentation does not control for the effect of between-group differences as does the statistical presentation of data. A portion of the apparent trend may be attributable to that effect.

The data, especially statistical, present no foundation from which it may be assumed that change has occurred. The rate at which group members interact in Section A, Positive Statements, remains unchanged across time.

Hypothesis 7 was proposed to determine if change occurs in the rate of interaction initiated in Section D, Negative Statements, by group members. This hypothesis is the complement of Hypothesis 6. As the group matures and positive statements are more in evidence, proportionally, the rate at which interaction is initiated in Section D should decrease.

For Hypothesis 7, the proportions necessary to calculate F were determined by comparing the number of units of Negative Statements made by group members to the total number of interactions initiated by group members. These proportions were used as X in the ANOVA computations. The results obtained to evaluate Hypothesis 7 are found in Table 8.

The effect of time spent in the advisory group environment upon rate of Negative Statements made by group members was not significant. No significant change in that rate

occurred on F test by analysis of variance. Differences between group mean rates of interaction in Section D were significant. Some groups interacted at significantly higher rates of Negative Statements than did others. Again, this effect is controlled by statistical design. Figure 8 contains the line graph representation of the data.

Table 8. Change in Rate of Group Member Interaction in Section D

Source of Variance	Sum of Squares	df	Mean Squares	F
Treatment	.027253	8	.003406	1.889
Blocks	.085156	5	.017031	9.446*
Residual	.072139	40	.001803	
Total	.184548	53		

$F_{.05;8,40}=2.18$.
*$p < .05$.

The trend in rate of Negative Statements apparently reflects a net increase. A net decrease was expected. But it should be noted that a part of the apparent increase in rate is due to significant differences between the groups. That is, not all increase in rate is attributable to time in the advisory groups.

Statistically, there is no evidence that change in rate of Negative Statements has occurred. By actually plotting the mean proportions per observational period, some indication exists that unexpected and undesired changes have

occurred. This is especially true when the graphs of all of the hypotheses are viewed together.

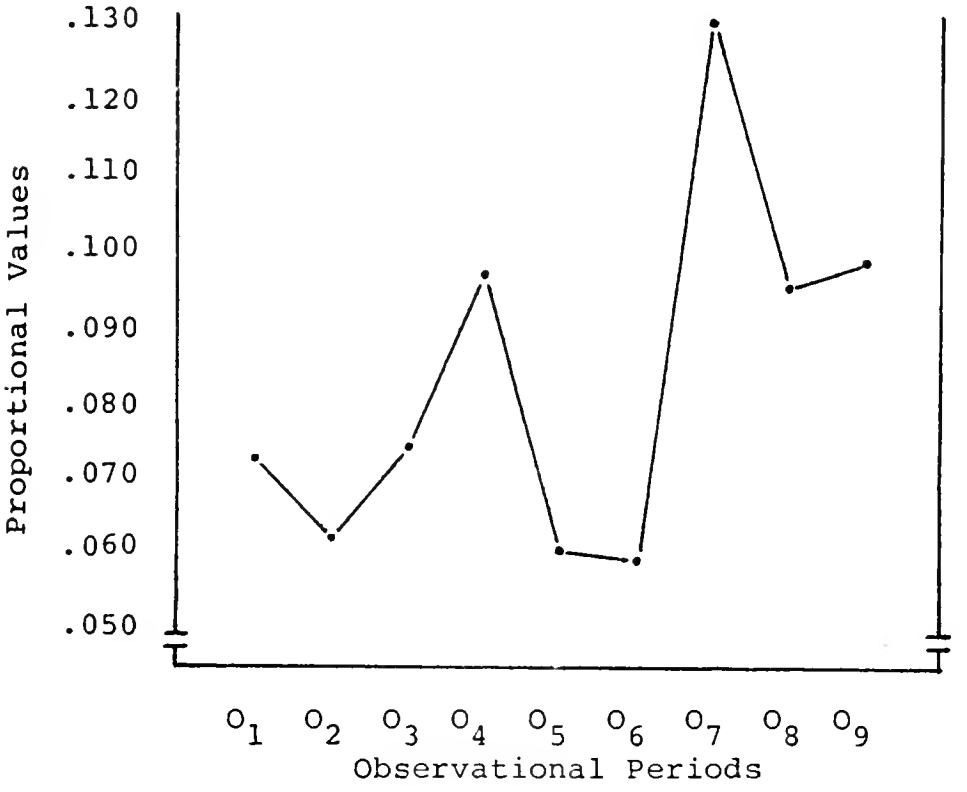

Figure 8. Mean values for that portion of all interaction made by group members categorized in Section D.

The preceding hypotheses are concerned with change in amount of interaction. The following four hypotheses are concerned with change in the sequence of categories in interaction.

Hypothesis 8 proposes that as the groups move toward the realization of purpose, the sequence of categories will change. Specifically, when Section A, Positive Statements, is a part of an individual's sequence the frequency with which Section B, Attempted Answers, serially follows Section A will increase.

To compute the proportions necessary to calculate values for F in Hypothesis 8, the number of times an individual's verbal act, categorized in Section A, was followed by his act, uninterrupted, categorized in Section B, was determined. This number was divided by the total number of times an individual changed from Section A to any other section of categories without interruption. This value was computed per group per observationsl period. These values were then utilized as X in the formulae to determine F. The results of those calculations are found in Table 9.

Table 9. Change in Rate of Section B Following Section A Interaction Made by One Group Member

Source of Variance	Sum of Squares	df	Mean Squares	F
Treatment	.146993	8	.018374	.652
Blocks	.084183	5	.016836	.597
Residual	1.127292	40	.028182	
Total	1.358468	53		

$F_{.05;8,40}=2.18$.

$p < .05$.

Neither the treatment nor the blocks effects showed significance. There were no statistical differences between time periods represented by treatment variance and between groups represented by blocks variance. No statistically significant change occurred in the rate at which Section A interactions followed Section B interactions by group members.

Graphical representation of the mean proportions from the data of Hypothesis 8 appear in Figure 9.

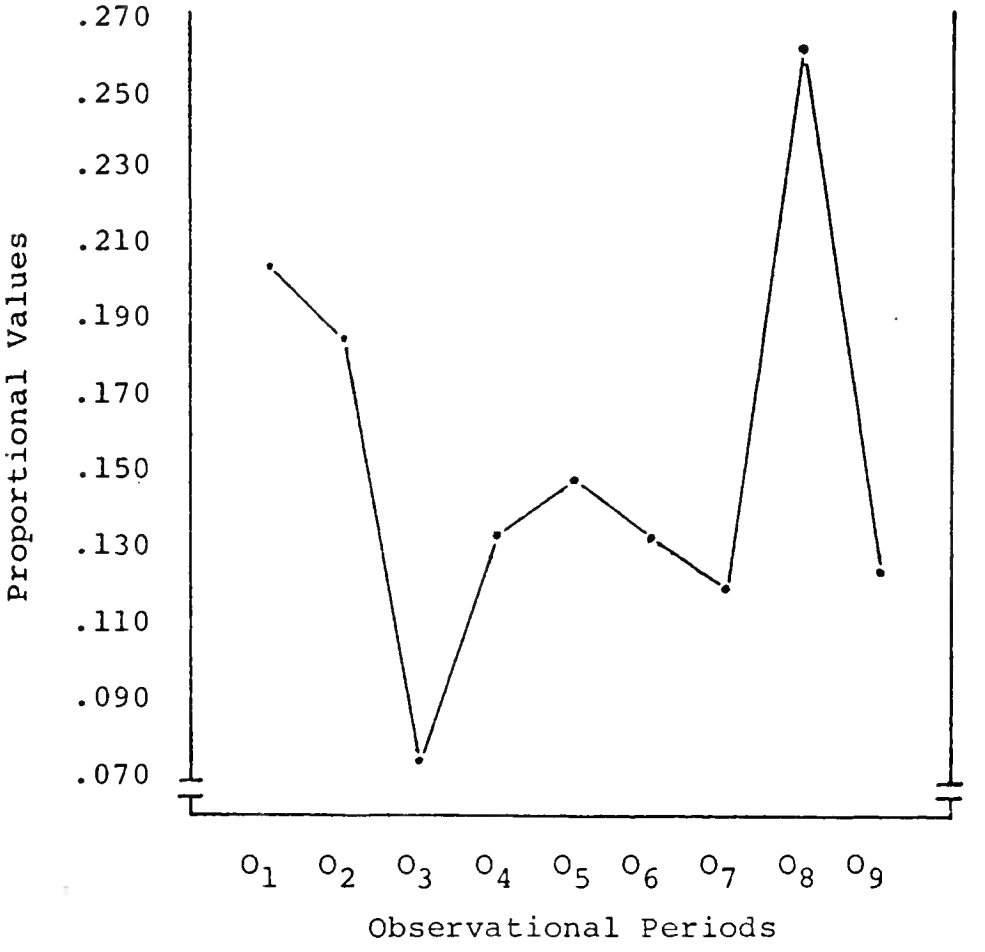

Figure 9. Mean values for that portion of Section A interactions followed by Section B interactions made by one group member.

The expected trend in graphed data for Hypothesis 8 was a net increase. The relatively high level of interaction at O_8 resulted from one group in which all Section A interactions were followed by Section B interactions. There were, in fact, two interactions in Section A for that group. Both of those were followed by interactions

categorized in Section B, resulting in an inflated mean proportion for observation 8. Considering this when looking for trends in the graph, there is no apparent change in rate of interaction. The sum of statistical and graphic data indicates that no change occurred in the rate at which group member interaction in Section A was followed by group member interaction in Section B.

A second type of change occurs when the categorical sequence of interactions between individuals is altered. Bales terms this sequence between individuals a "reactive interaction."[10] For example, casual acquaintances may be characterized by a pattern of interaction quite different from that of close friends. As the acquaintanceship becomes closer, the simple pattern of interaction becomes rich and complex. Hypotheses 9 through 11 explore the possibility that some of these alterations in pattern will occur in the advisory groups and will reflect movement toward purposes 1, 2, and 3.

Hypothesis 9 proposes that the number of times a Section B, Attempted Answers, response follows a Section D, Negative Statements, interaction will increase. If the groups move toward a sense of community, we expect that the members will become more tolerant of, and less defensive toward, one another. To the extent this is so, Negative Statements should be

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10. Robert F. Bales, "The Equilibrium Problem in Small Groups," p. 449.

perceived increasingly as honest expressions of attitude and feeling and less as personal, derogatory remarks.

To compute F, proportions were determined from the number of times an individual responded to an interaction categorized in Section D with an act categorized in Section B and the total number of responses made to acts categorized in Section D. The results of the calculations are found in Table 10.

Table 10. Change in Rate of Section B Following Section D Interaction

Source of Variance	Sum of Squares	df	Mean Squares	F
Treatment	.105017	8	.013127	.402
Blocks	.120786	5	.024157	.741
Residual	1.304655	40	.032616	
Total	1.530458	53		

$F_{.05;8,40}=2.18$.
$p < .05$.

F ratios derived from analysis of variance of the data are not significant. There was no statistical difference between treatment levels or between groups. The number of times Section B interactions follow Section D interactions, reactively, did not increase as anticiapted.

A line graph of the mean proportions per observation period appears in Figure 10.

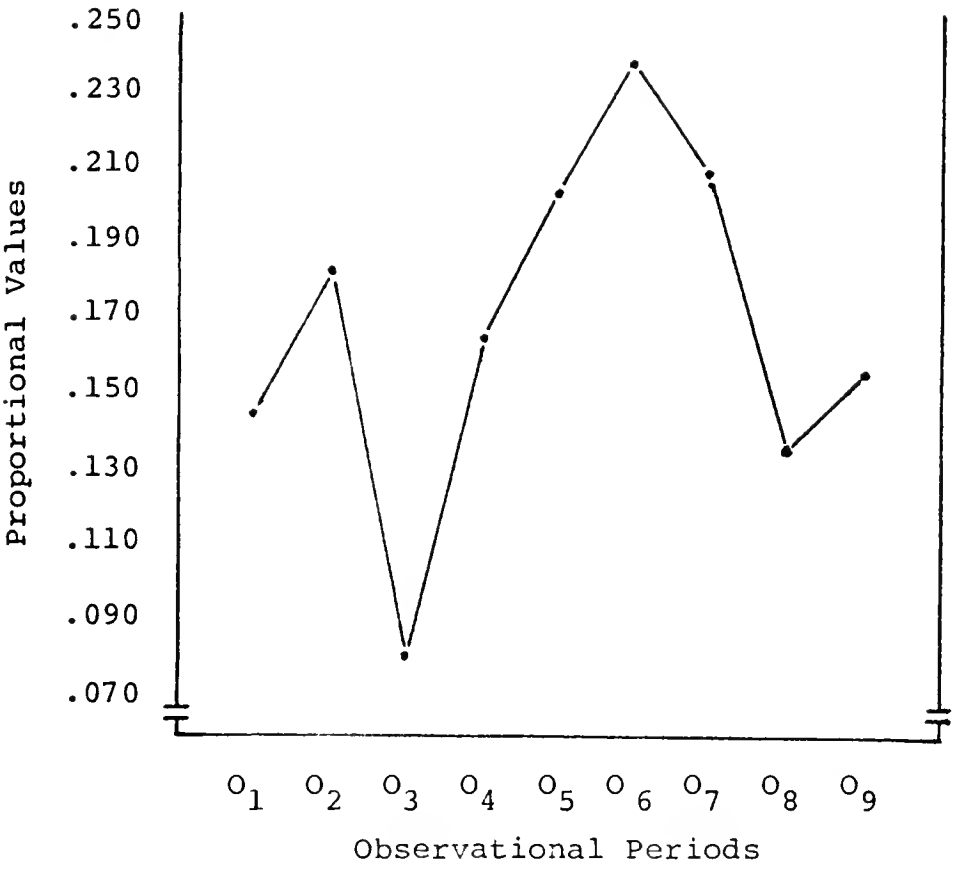

Figure 10. Mean values for that portion of Section D interaction followed by Section B interactions.

The anticipated trend in the data of Hypothesis 9 was a net increase in proportion. The steady increase from O_3 to O_6 is negated by the decrease in proportion that occurred later in the experiment. The values at O_6 and O_7 are inflated, in part, by proportions from single groups which greatly exceed the mean values for those observational periods. The Appendix contains those raw values. Available data for evaluation of Hypothesis 9 indicate that the expected increase in the rate at which Section B interactions would follow Section D interactions did not occur.

From the expectations that the members of the group will find the group, increasingly, a source of security and reinforcement, Hypothesis 10 proposes that Negative Statements will follow Questions at a decreasing rate. In a supportive emotional climate it is expected that Questions by members and advisors will contain little or no threatening aspects. As such, Questions should not require a defensive, emotional response. Thus, if the groups are moving toward achievement of purpose, Negative Statements should result from Questions to a lesser degree as time in the advisory groups passes.

The proportions prepared for computational purposes for Hypothesis 10 were obtained from the number of times a Negative Statement, by a group member, was made in response to a Question made by a first group member in relation to the total number of times any response was made to a Question. These proportions were the raw data for the formulae for F. The results of those calculations are found in Table 11.

Table 11. Change in Rate of Section D Following Section C Interaction

Source of Variance	Sum of Squares	df	Mean Squares	F
Treatment	.013289	8	.001661	1.196
Blocks	.039771	5	.007954	5.722*
Residual	.0055608	40	.001390	
Total	.108668	53		

$F_{.05;8,40}=2.18$.
*$p < .05$.

Inspection of the summary table for Hypothesis 10 indicates that there was no significant change between treatment levels. The anticipated decrease in the rate at which Negative Statements follow Questions was not evident in the data. There was, however, real difference between groups. As before, the randomized block design partitioned that influence out of the total effect. The group differential did not mask or inflate any treatment effect. Graphically, these data appear in Figure 11.

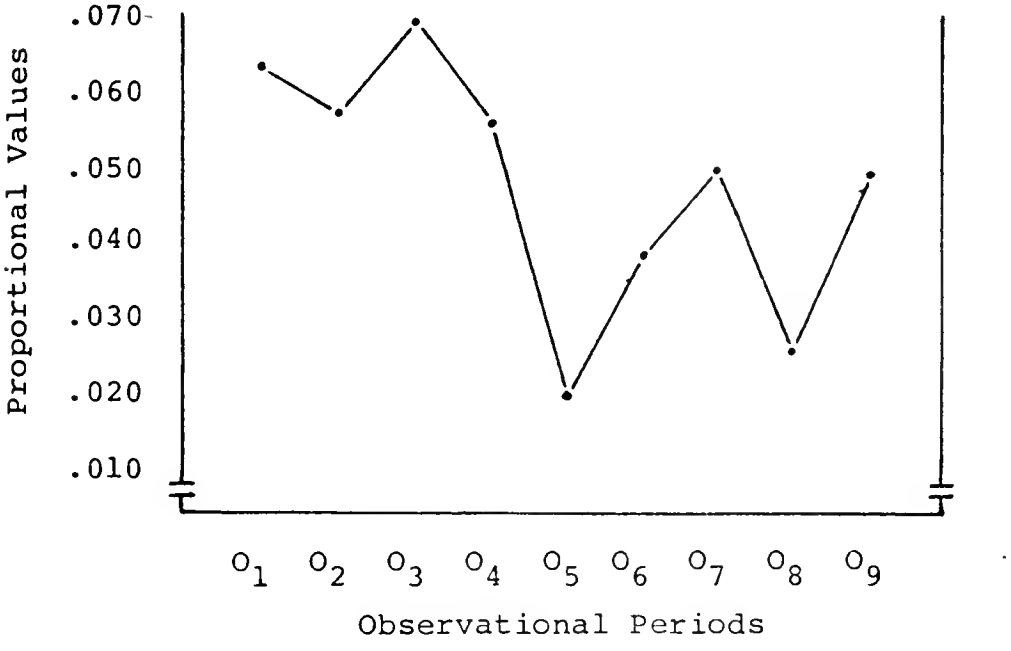

Figure 11. Mean values for that portion of Section C interaction followed by Section D interactions.

The slight observed trend of net decrease is in the anticipated direction. The reader should bear in mind that the significant differences between groups may exert some influence on the observed trend. It does not appear that

any evidence is available which would support the hypothetical contention that Section D interactions, Negative Statements, would follow Section C interactions, Questions, at a decreasing rate.

In the same respect that Negative Statements should be used less frequently in response to Questions, they should be used less frequently as a response to Attempted Answers. The proposed development of a group atmosphere of trust, tolerance, and understanding should result in the perception that Attempted Answers, correct or incorrect, are posed as sincere efforts to solve problems offered by the advisor or group member. And, as such, they should be empty of threat. These thoughts are reflected in Hypothesis 11. Negative Statements should be used less frequently as a response to Attempted Answers in the advisory group situation as time passes.

Proportions used to compute values for F were determined as before. Ratios were established between the number of times an Attempted Answer from a group member was followed by a Negative Statement from a second group member and the total number of times any response was made to an Attempted Answer. The result of the calculations are found in Table 12.

Analysis of variance of data from Hypothesis 11 indicates that no significant differences exist between treatment levels. The rate at which Negative Statements followed

Attempted answers did not decrease. Difference between groups was significant. This effect does not alter the statistical validity of treatment variance.

Table 12. Change in Rate of Section D Following Section B Interaction

Source of Variance	Sum of Squares	df	Mean Squares	F
Treatment	.216073	8	.027009	1.012
Blocks	.347232	5	.069446	2.602*
Resudual	1.067574	40	.026689	
Total	1.630879	53		

$F_{.05;8,40}=2.18$.
*$p < .05$.

The mean proportions per observation are graphically illustrated in Figure 12.

The obvious trend is toward a net increase in proportion of interaction. The expected trend was for a net decrease. Two factors contribute to the apparent increase in proportion. First, the proportion of interaction during O_7 for one group was quite above the mean value for that observation period. That single value inflated the mean value. The same may be said for the relatively high mean proportion during O_8. Secondly, the significant inter-group differences, controlled during statistical analysis, are not controlled in this graph. We cannot assume that a net increase exists. Significant results would indicate that Negative Statements, Section

D, are used less frequently as a response to interactions initiated in Section B, Attempted Answers. None of the analyses of data proved to be significant. Thus, there is little or no evidence to support this hypothesis.

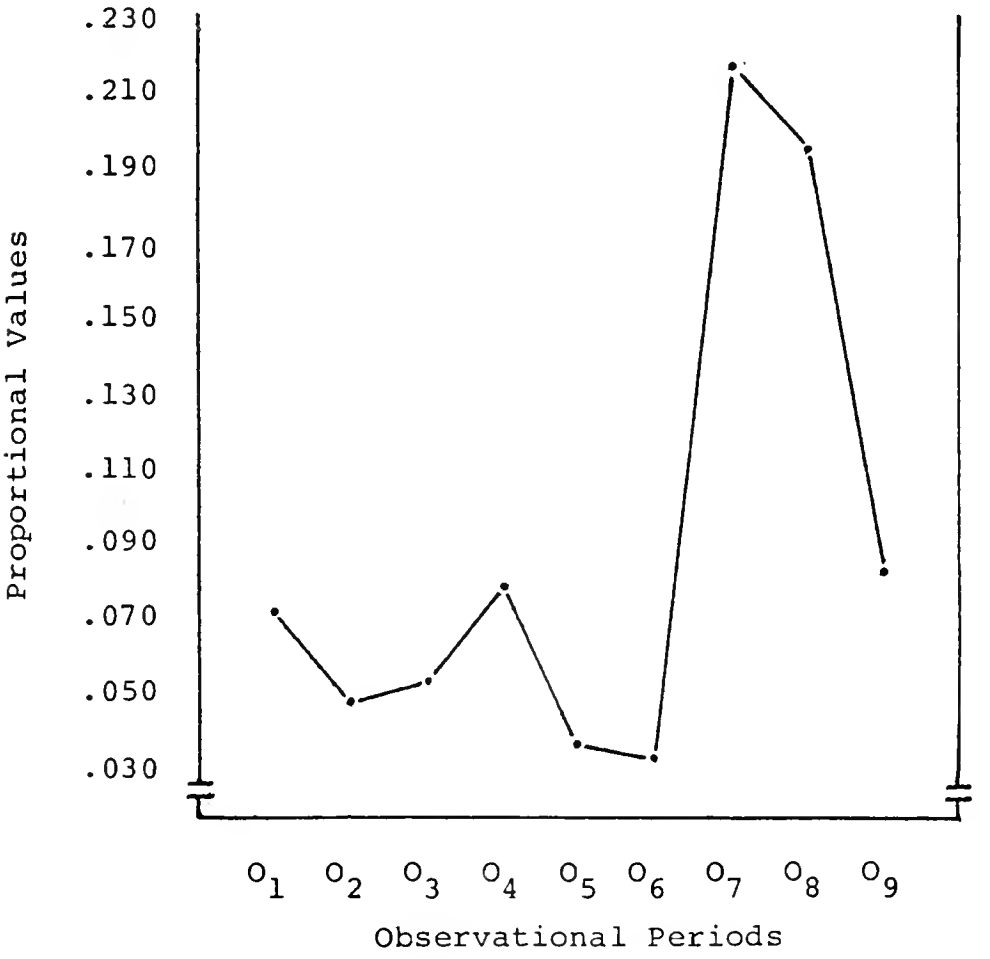

Figure 12. Mean values for that portion of Section B interaction followed by Section D interactions.

Summary

Eleven hypotheses were proposed for testing in this study. By experimental design, 43 pairwise comparisons were expected to reflect significant change. Specifically,

those were comparisons of O_3-O_4, O_6-O_7, and O_3-O_7 in all hypotheses. There were 362 other pairwise comparisons in which change was possible. Analysis of variance was made on the data for these hypotheses. Mean values of each observational period were plotted graphically, also.

None of the possible pairwise comparisons for treatment effect proved to be significant. The treatment, time spent in the advisory group, had no statistically significant effect in the hypothesized directions.

Graphs of data for the various hypotheses offer no consistent aid in establishing the success of the advisory group in meeting its goals 1, 2, and 3. Trends in graphed data for Hypotheses 5, 6, and 7 are not in the anticipated directions. Trends in graphs for Hypotheses 8 and 10 are in the anticipated direction. However, all of these trends are qualified by deviant group effects which bring their meaning into serious question.

The lack of significant results obtained in this experiment clearly does not support the hypothesized changes in interaction. Based on a hypothetical correlation between change in interaction and growth toward acceptance of the group as a home base, a place where dialogue takes place, and as the center of the school community, it must be assumed that the advisory group program did not make significant growth toward its purposes designated 1, 2, and 3.

CHAPTER V

SUMMARY, LIMITATIONS, AND CONCLUSION

Summary

The purpose of this study was to determine the success of the advisory group program in achieving certain of their goals as reflected by changes in verbal interaction.

In an attempt to counteract the negative potential coincidental to an innovation in the curriculum at the P. K. Yonge Laboratory School, the faculty proposed that advisory groups be established. Every pupil in the high school was placed in one of six advisory groups in his grade level. Instructional and staff members served as advisors.

Six purposes were included in the original proposal for advisory groups. They are 1) to provide each student with a stable group to which he can relate as a home base, 2) to provide the student with a place for dialogue about school-related problems, 3) to build a feeling of community among students, 4) to provide each student with an adult who is responsible for the coordination of his total school experience, 5) to provide faculty members with common experiences to increase involvement in the total school program, and 6) to provide early identification of students with problems and to assist them in the solution of these

problems. The groups also served as the administrative unit and as the representative unit for student government.

Purposes 1, 2, and 3 were those selected as criteria for this study. The faculty felt that the achievement of these goals would establish the merit of this program as new and valuable. If evidence could be gathered which indicated that the groups were providing a home base, a place where dialogue could take place, and sense of community, then the advisory group model could become a valuable adjunct to a total curriculum.

To form one basis for measuring whether or not these purposes were achieved in any part, eleven hypotheses were proposed. All eleven hypotheses deal with aspects of verbal interaction. The review of the literature for this study suggested that a sufficient basis existed to suppose that verbal interaction reflected levels of tolerance, trust, understanding, and unity in the group. By measuring changes in verbal interaction, insight would be obtained into changes in the levels of tolerance, trust, understanding, and unity.

To maximize validity in a situation in which no control groups were available, the times-series design, described by Stanley and Cambell[1] was utilized as the data-gathering model. To meet the conditions of this design, data were gathered on nine separate occasions; three times at the

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1. Campbell and Stanley, p. 40.

first of the school year, three times at the middle of the school year, and three times at the end of the school year.

The instrument used to obtain data was the category observation system developed by R.F. Bales.[2] This system was specifically developed to characterize all types of verbal interaction in one of twelve categories.

Each of the six groups in the sample was observed and verbal interaction recorded for twenty minutes on the nine data-gathering occasions. Due to circumstances beyond the control of the researcher, one group was observed only five times and one other group only six times.

The raw data, numbers of interactions in specific categories, were converted to proportions and tested for ten hypotheses via the analysis of variance method. The particular model for the analysis of variance in this study was the randomized block design.[3] This model was used for its adaptability to repeated measures of the same subject and its intended control for effects due to variation between groups of subjects. Significance was recognized for values of F at, or beyond, the .05 level. For the eleventh hypothesis, the proportions were tested via a t test for variance reported by Walker and Lev.[4] Significance was

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2. Bales, Interaction Process Analysis.

3. Kirk, p. 131.

4. Walker and Lev, p. 190.

recognized for t values at the .05 level on a one-tailed test.

The randomized block design model produces two values for F. One of these reflects differences between treatment levels. In this study, treatment levels were the different lengths of time that the advisory groups had been operational. The second F value reflected differences between blocks. The blocks were the different advisory groups. Blocks were formed at this level to control various differences between groups. The results of analysis of treatment differences were not significant in any case. The results of analysis of block differences were significant for Hypotheses 1, 2, 6, 7, 10, and 11. This study, however, was not designed to examine inter-group differences, only inter-treatment differences. That is, this study was designed to evaluate the concept of the advisory group, not the success of a single group and its advisor in using the concept. Its usefulness as a technique would be limited if success was determined by criteria external to the technique.

In addition, mean proportional values per observational period were graphed for each hypothesis. These graphed means did not offer conclusive evidence with regard to the achievement of purpose in the advisory groups.

On the basis of statistical and graphic analysis of observational data, it is not possible to conclude that the advisory group program made measurable movement toward achievement of its goals 1, 2, and 3.

Limitations

Every experimental result is by its very nature limited. The present experimental conclusions must not be construed as implying closure for this case or as generalizable to other situations with some characteristics common to the advisory group program. These results apply to this one instance as it existed when tested.

The principal consideration which must be made with regard to these results is that this study is dependent upon a hypothesized correlation between interaction and personal growth and group growth toward certain purposes. If this correlation does not obtain, then no basis exists to expect that measured interactional changes are reflective of group growth toward purposes. Significant interactional change could be obtained and group growth inferred, when, in reality, no growth occurred. Or growth might occur when interactional change is immeasurable, leading to the conclusion that no growth occurred. However, the research reviewed in Chapter II of this study is straightforward with regard to the relationship between interaction change and change in the quality of the group life.

A second consideration which may have been influential in this study was the instrument used to gather data. The Bales model may not have been responsive enough in this situation. As discussed earlier, an operational measure of the sensitivity of an instrument is whether it is able to make discriminations resulting in significance. By this

test, the instrument was inadequate.[5] However, the literature is replete with examples of the ability of the Bales model to discriminate in controlled situations of small groups interacting. The larger advisory groups interacting in a less structured way may tax the sensitivity of the Bales system.

Thirdly, the possibility exists that the instrument was abused by relying on the skill of one observer. Any bias in the use of the category system would be systematic and remain obscured in any attempt to control this source of error through statistical audit of observer reliability. Even if this bias is present, the possibility that some significant interactional change, if present, would not be detected is remote.

A final limitation concerns the hypotheses. The particular aspects of interactional change chosen as reflective of growth in the advisory groups and phrased hypothetically may not have tapped areas of interaction in which change occurred. In the developmental stages of this study, this possibility was foreseen and the hypotheses were specifically designed to cover as broad an area of interactional varieties as possible. As above, the possibility that none of the hypotheses covered interactional areas in which significant change may have occurred is remote.

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5. It is possible, however, that no real change occurred. In that case, the Bales model was not tested for sensitivity.

Conclusion

The statistical results of this study indicate that growth toward purposes 1, 2, and 3 did not take place. The author wishes to make it clear that he does not feel that these results are a judgment of the theoretical model of the advisory group, but of the implementation of that model. The many variables instrumental in the success of a new program in a functional situation were not controlled to the degree required. If variables such as total preparation of faculty and staff for their new role as advisors, structure of the reward system for advisors, and pupil input in planning had been recognized as significant and dealt with accordingly, the author feels the outcome would have been different. Sarasen, in The Culture of the School and the Problem of Change describes many instances in which implementation preceded adequate preparation and planning. These "innovations" rarely resulted in any significant change. If this study is to have significance beyond the mere recognition that, from one perspective, a new program was not successful, it is to make conspicuous that innovation in education is too often a case of too much, too soon.

APPENDIX

RAW DATA FROM OBSERVATIONAL RECORDS

APPENDIX

RAW DATA FROM OBSERVATIONAL RECORDS

Hypothesis 1

Group	t_{O_1}/T	t_{O_2}/T	t_{O_3}/T	t_{O_4}/T	t_{O_5}/T	t_{O_6}/T	t_{O_7}/T	t_{O_8}/T	t_{O_9}/T
1	95/708	145/606	76/584	107/516	63/272	51/327	45/219	69/372	39/283
2	281/631	370/543	93/180	256/551	74/170	196/365	136/273	48/142	109/268
3	145/408	146/371	183/377	80/293	85/407	79/328	38/192	46/125	47/121
4	183/301	192/332	240/390	83/183	131/341	94/200	97/185	68/225	88/157
5	34/178	127/395	164/433	a	a	a	17/31	32/64	50/125
6	84/302	126/341	147/445	a	a	a	69/160	82/83	a

t=number of acts initiated by advisors per group.
T=total number of acts initiated by advisors and group members per observational period.
a=groups unavailable for collection of data.

Hypothesis 2

Group	t_{O_1}/T	t_{O_2}/T	t_{O_3}/T	t_{O_4}/T	t_{O_5}/T	t_{O_6}/T	t_{O_7}/T	t_{O_8}/T	t_{O_9}/T
1	613/708	461/606	508/584	409/516	209/272	276/327	174/219	303/372	244/283
2	350/631	173/543	87/180	295/551	96/170	169/365	137/273	94/142	159/268
3	263/408	225/371	194/377	213/293	322/407	249/328	154/192	79/125	74/121
4	118/301	140/332	150/390	100/183	210/341	106/200	88/185	157/225	69/157
5	144/178	268/395	269/433	a	a	a	14/31	32/64	75/125
6	218/302	215/341	298/445	a	a	a	91/160	1/83	a

t=number of acts initiated by group members per group.
T=total number of acts initiated by advisors and group members per observational period.
a=group unavailable for collection of data.

Hypothesis 4

Group	O_{1_T}	O_{2_T}	O_{3_T}	O_{4_T}	O_{5_T}	O_{6_T}	O_{7_T}	O_{8_T}	O_{9_T}
	t/T	t/T	t/T	t/T	t/T	t/T	t/T	t/T	t/T
1	9/95	16/145	18/76	8/107	6/63	4/51	2/45	10/69	1/39
2	23/81	27/370	9/93	18/256	4/74	12/196	7/136	1/48	11/109
3	15/145	7/146	7/183	2/80	3/85	8/79	4/38	8/46	3/47
4	14/183	12/192	28/240	10/83	15/131	9/94	10/97	10/68	5/88
5	4/34	4/127	5/164	a	a	a	1/17	4/32	4/50
6	2/84	11/126	10/147	a	a	a	7/69	9/82	a

t=number of acts initiated by advisors per group in categories 1, 2, and 3.
T=total number of acts initiated by advisors per observational period.
a=group unavailable for collection of data.

Hypothesis 5

Group	O_{1_T}	O_{2_T}	O_{3_T}	O_{4_T}	O_{5_T}	O_{6_T}	O_{7_T}	O_{8_T}	O_{9_T}
	t/T	t/T	t/T	t/T	t/T	t/T	t/T	t/T	t/T
1	0/95	0/145	0/76	1/107	0/63	0/51	0/45	2/69	0/39
2	2/281	2/370	0/93	1/256	0/74	2/196	1/136	0/48	0/109
3	4/145	0/146	0/183	0/80	2/85	0/79	0/38	0/46	0/47
4	1/183	0/192	0/240	0/83	0/131	0/94	0/97	1/68	2/88
5	0/34	1/127	1/169	a	a	a	0/17	0/32	1/50
6	0/84	0/126	1/147	a	a	a	0/69	2/82	a

t=number of acts initiated by advisors per group in categories 10, 11, and 12.
T=total number of acts initiated by advisors per observational period.
a=group unavailable for collection of data.

APPENDIX--(continued)

Hypothesis 6

Group	O_1 t/T	O_2 t/T	O_3 t/T	O_4 t/T	O_5 t/T	O_6 t/T	O_7 t/T	O_8 t/T	O_9 t/T
1	48/613	38/461	36/508	37/409	11/209	14/276	6/174	19/303	29/244
2	13/350	7/173	9/87	29/295	4/96	7/169	7/137	7/94	13/159
3	16/263	8/225	5/194	23/213	12/322	20/249	2/154	2/79	3/74
4	8/118	7/140	14/150	8/100	21/210	13/106	5/88	23/157	1/69
5	18/144	23/268	26/269	a	a	a	1/14	5/32	7/75
6	9/218	13/215	33/298	a	a	a	8/91	0/1	a

t=number of acts initiated by group members per group in categories 1, 2, and 3.
T=total number of acts initiated by group members per observational period.
a=group unavailable for collection of data.

Hypothesis 7

Group	O_1 t/T	O_2 t/T	O_3 t/T	O_4 t/T	O_5 t/T	O_6 t/T	O_7 t/T	O_8 t/T	O_9 t/T
1	51/613	29/461	48/508	85/409	20/209	14/276	30/174	21/303	15/244
2	25/350	5/173	3/87	11/295	1/96	5/169	2/137	6/94	7/159
3	42/263	38/225	28/194	23/213	24/322	32/249	26/154	16/79	17/74
4	1/118	0/140	4/150	3/100	8/210	0/106	8/88	16/157	4/69
5	6/144	9/268	16/269	a	a	a	1/14	4/32	8/75
6	14/218	15/215	16/298	a	a	a	23/91	0/1	a

t=number of acts initiated by group members per group in categories 10, 11, and 12.
T=total number of acts initiated by group members per observational period.
a=group unavailable for collection of data.

Hypothesis 8

Group	t_{O_1}/T	t_{O_2}/T	t_{O_3}/T	t_{O_4}/T	t_{O_5}/T	t_{O_6}/T	t_{O_7}/T	t_{O_8}/T	t_{O_9}/T
1	6/48	12/38	7/36	4/37	2/11	1/14	1/6	0/19	6/29
2	2/13	0/7	0/9	2/29	1/4	3/7	1/7	1/7	1/13
3	3/16	2/8	0/5	3/23	0/12	0/20	0/2	2/2	1/3
4	2/8	2/7	1/14	2/8	4/21	1/13	2/5	5/23	0/1
5	3/18	4/23	2/26	a	a	a	0/1	1/5	0/7
6	3/9	1/13	3/33	a	a	a	0/8	0/0	a

t=number of acts initiated by group members per group in categories 4, 5, and 6 following categories 1, 2, and 3.
T=total number of acts initiated by group members per observational period in categories 1, 2, and 3.
a=group unavailable for collection of data.

Hypothesis 9

Group	t_{O_1}/T	t_{O_2}/T	t_{O_3}/T	t_{O_4}/T	t_{O_5}/T	t_{O_6}/T	t_{O_7}/T	t_{O_8}/T	t_{O_9}/T
1	13/51	3/29	7/48	10/85	4/20	3/14	4/30	3/21	3/15
2	2/25	1/5	0/3	4/11	0/1	3/5	0/2	1/6	1/7
3	12/42	6/38	4/28	5/23	11/24	7/32	2/26	3/16	3/17
4	0/1	0/0	0/4	0/3	1/8	0/0	0/8	5/16	1/4
5	1/6	2/9	1/16	a	a	a	1/1	0/4	0/8
6	1/14	6/15	2/16	a	a	a	1/23	0/0	a

t=number of acts initiated by group members per group in categories 4, 5, and 6 following categories 10, 11, and 12.
T=total number of acts initiated by group members per observational period in categories 10, 11, and 12.
a=group unavailable for collection of data.

Hypothesis 10

Group	0_1	0_2	0_3	0_4	0_5	0_6	0_7	0_8	0_9
	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$
1	6/81	5/64	5/88	5/55	0/44	3/57	2/40	3/92	1/44
2	3/63	2/38	2/17	4/48	0/17	1/23	0/43	1/25	0/52
3	6/30	4/37	4/37	2/40	3/85	2/41	3/54	2/27	3/16
4	1/25	0/21	0/20	0/11	1/41	0/6	3/33	0/29	1/30
5	0/21	0/31	1/30	a	a	a	0/7	0/15	0/21
6	1/66	4/39	4/46	a	a	a	2/21	0/1	a

t=number of acts initiated by group members per group in categories 10, 11, and 12 following categories 7, 8, and 9.
T=total number of acts initiated by group members per observational period in categories 7, 8, and 9.
a=group unavailable for collection of data.

Hypothesis 11

Group	0_1	0_2	0_3	0_4	0_5	0_6	0_7	0_8	0_9
	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$	$t\ {}_T$
1	22/433	11/330	10/336	41/232	6/134	5/191	13/98	12/171	6/156
2	14/249	5/123	4/58	8/207	1/74	3/134	1/85	4/56	4/87
3	26/175	19/142	16/124	11/127	12/201	12/156	9/72	3/34	11/38
4	4/84	1/112	5/112	2/78	2/140	0/87	1/42	5/89	1/34
5	5/129	4/148	4/203	a	a	a	0/39	0/0	2/39
6	9/99	9/205	6/197	a	a	a	5/5	7/8	a

t=number of acts initiated by group members per group in categories 10, 11, and 12 following categories 4, 5, and 6.
T=total number of acts initiated by group members per observational period in categories 4, 5, and 6.
a=group unavailable for collection of data.

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BIOGRAPHICAL SKETCH

Worley Thaxton Springfield, Jr., was born July 21, 1942, in Atlanta, Georgia. He received his public education in Gainesville, Florida, at J.J. Finley Elementary School, F.W. Buchholz Junior High School, and P.K. Yonge Laboratory School.

After receiving the Bachelor of Arts degree from Emory University in 1964, the author entered the United States Air Force. In 1968, he entered the University of Florida, where he received the degree of Master of Education with a major in Foundations of Education one year later. In 1973, he received the degree of Doctor of Philosophy with a major in Foundations of Education.

The author joined the original staff of New Voices in Education, serving in various capacities for two years. He is a member of Phi Delta Kappa, The John Dewey Society, and Alpha Tau Omega.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Vynce A. Hines

Vynce A. Hines, Chairman
Professor of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Robert L. Curran

Robert L. Curran
Professor of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Benjamin L. Gorman
Professor of Sociology

This dissertation was submitted to the Dean of the College of Education and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

December, 1973

Dean, College of Education

Dean, Graduate School